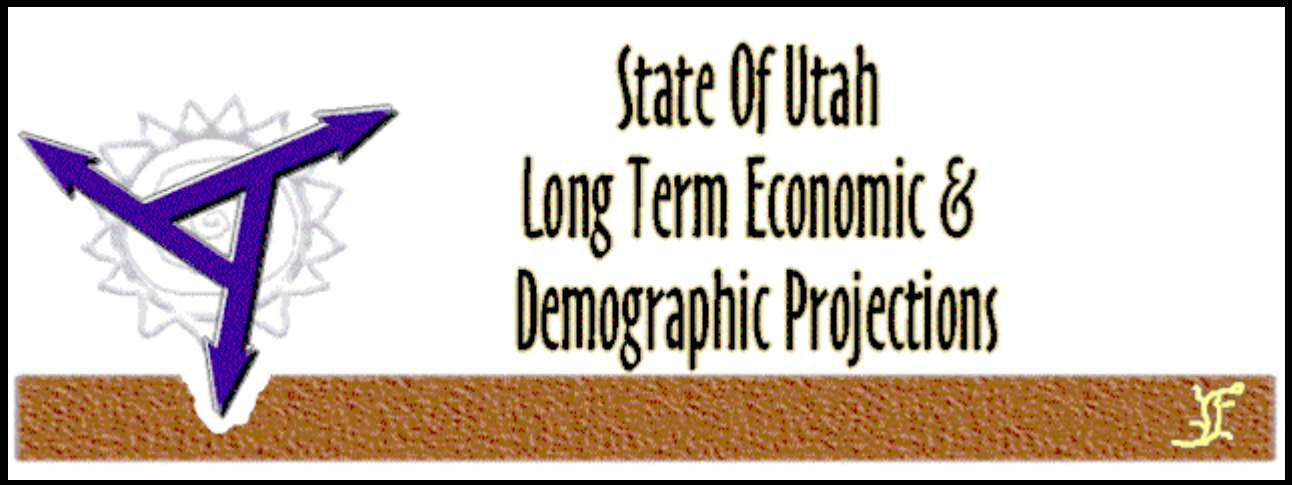

Utah 2050: Alternative Futures

Pam Perlich Ross Reeve

Utah Long Term Projections Program

Governor's Office of Planning & Budget

May 13, 1999

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Regional Scenarios

- Recent scenario analysis for Envision Utah has taken our 1997 UPED regional baseline and investigated different small area allocations of this baseline with other methods and models.
- The present study examines alternative demographic and economic paths for the State.
- These regional growth scenarios are a work in progress, not a new official baseline.
- We explore various possible future paths for the State's population and economy.

Method & Timeframe

- Utilize the State's long term simulation model: Utah Process Economic and Demographic Projection Model
- Identify high, medium, and low time paths for model exogenous variables and parameters: economic growth, fertility, life expectancy, and labor force participation
- Generate alternative growth scenarios to 2050

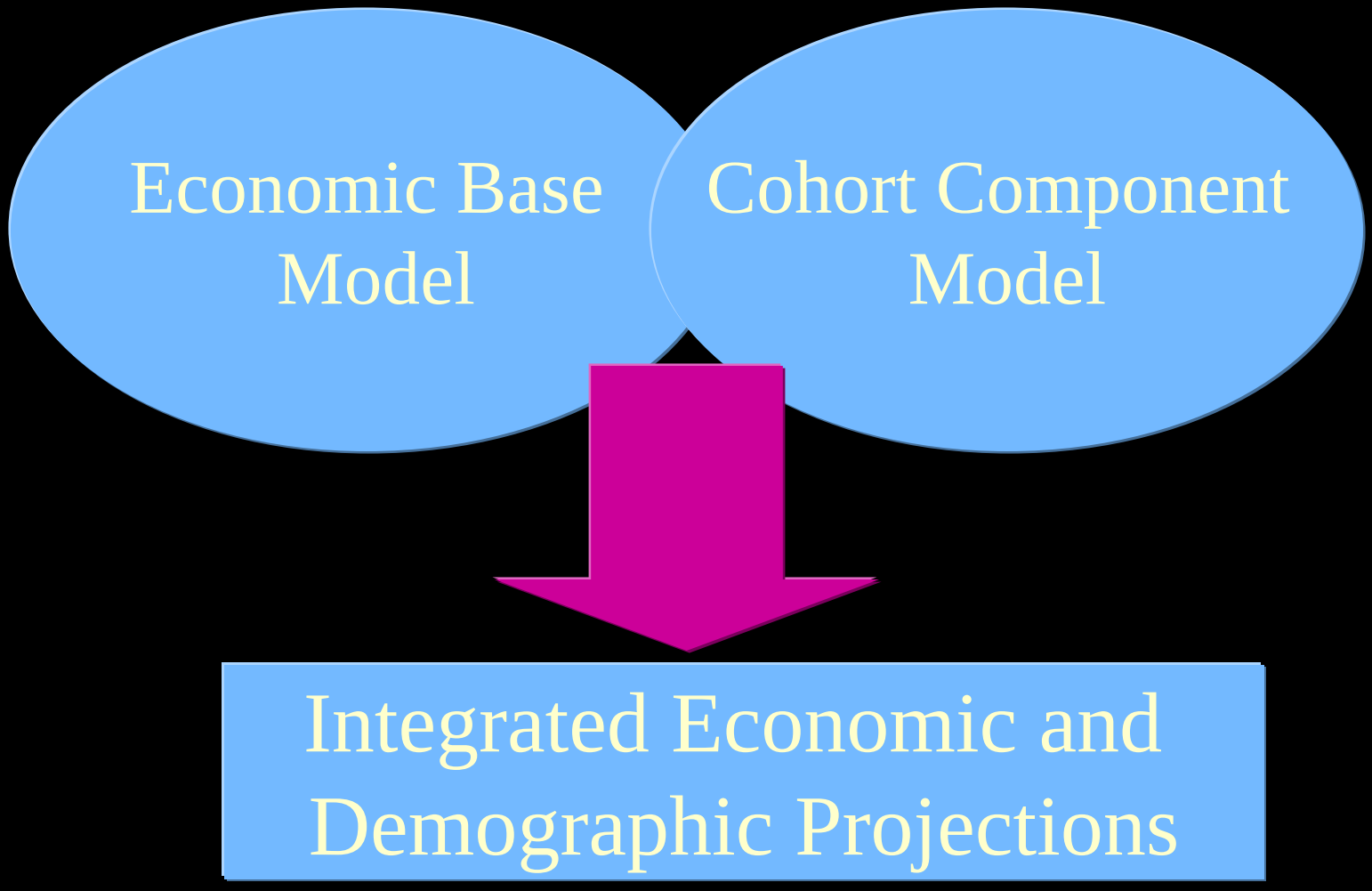
Long Term Simulations

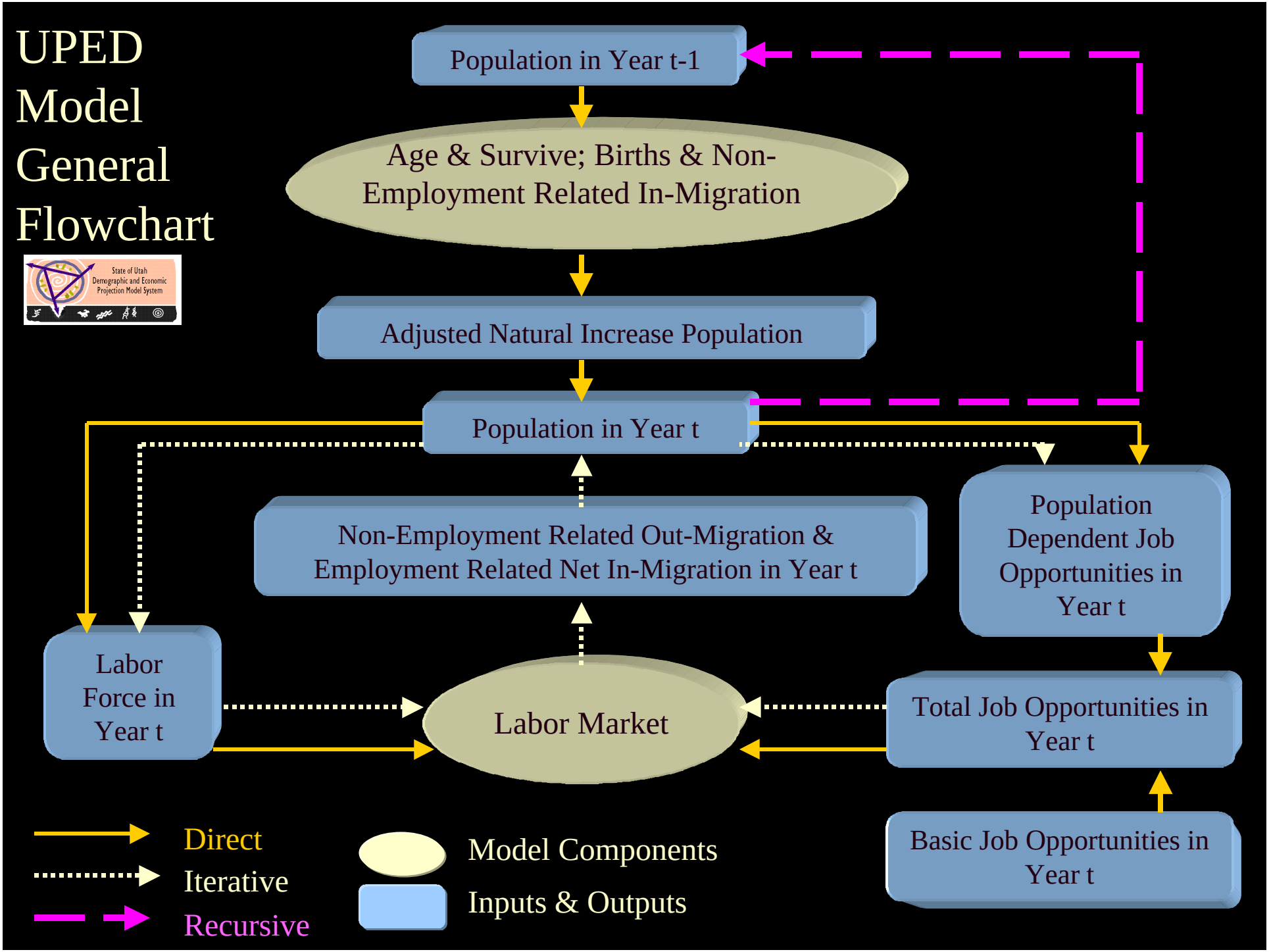
- This ceterus paribus analysis approach acknowledges the uncertainty in the projections and identifies the potential range of outcomes.
- The method and time frame used here are standard practice for analogous Federal policy analysis simulations.
- GAO: The use of long term economic and demographic simulations can “help establish a long-term framework linking budget planning and long- term fiscal policy goals.”

Long Term Projections

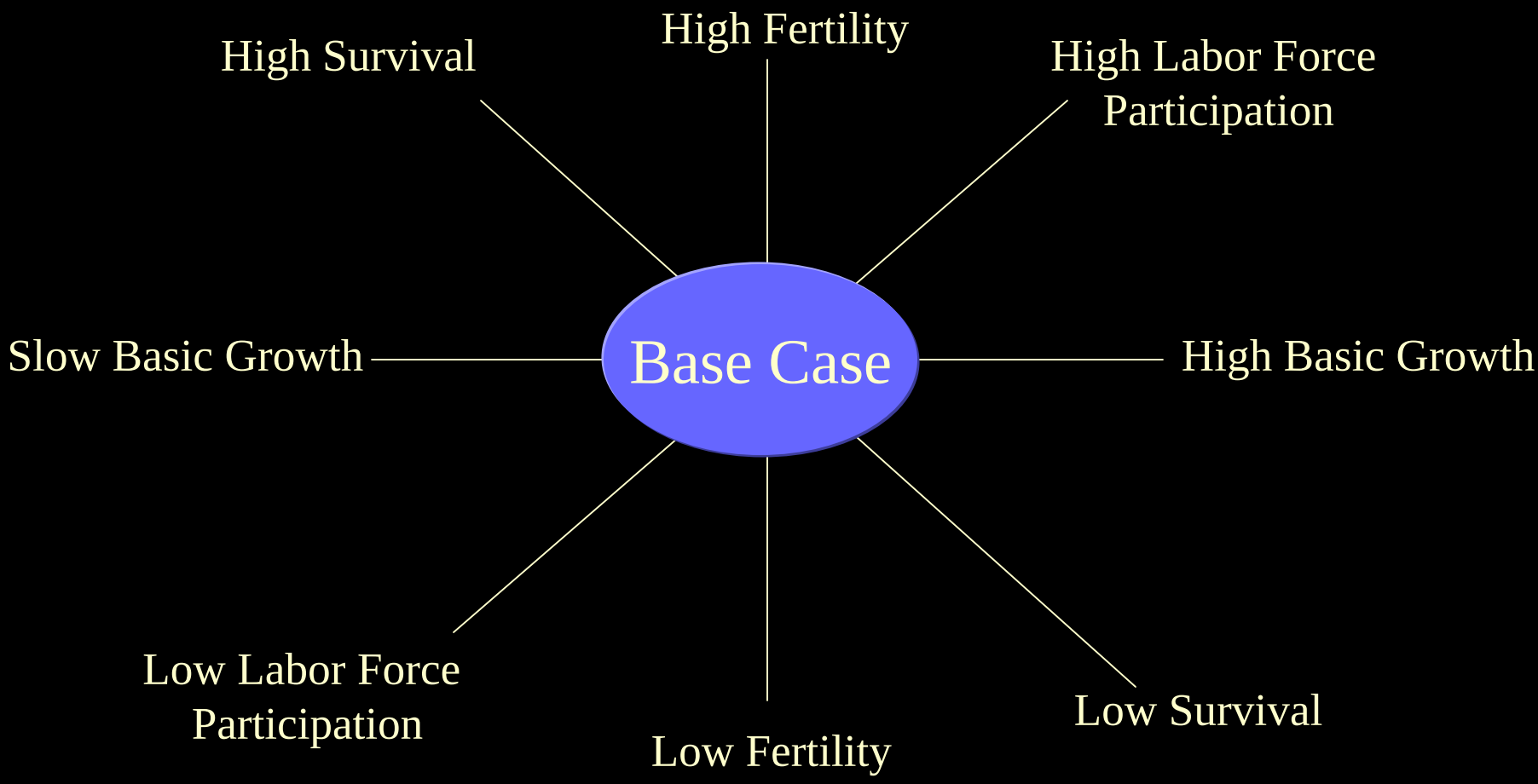
- Office of Management & Budget: 2070
- Congressional Budget Office: 2070
- General Accounting Office: 2050
- Social Security Administration: 2070
- Bureau of the Census: 2100
- United Nations: 2050

Utah Process Economic & Demographic Model (UPED)




UPED Model General Flowchart
State of Utah Demographic and Economic Projection Model System
Population in Year t-1
Age & Survive; Births & Non-Employment Related In-Migration
Adjusted Natural Increase Population
Population in Year t
Non-Employment Related Out-Migration & Employment Related Net In-Migration in Year t
Population Dependent Job Opportunities in Year t
Labor Force in Year t
Labor Market
Total Job Opportunities in Year t
Basic Job Opportunities in Year t
Direct
Iterative
Recursive
Model Components
Inputs & Outputs

Scenarios

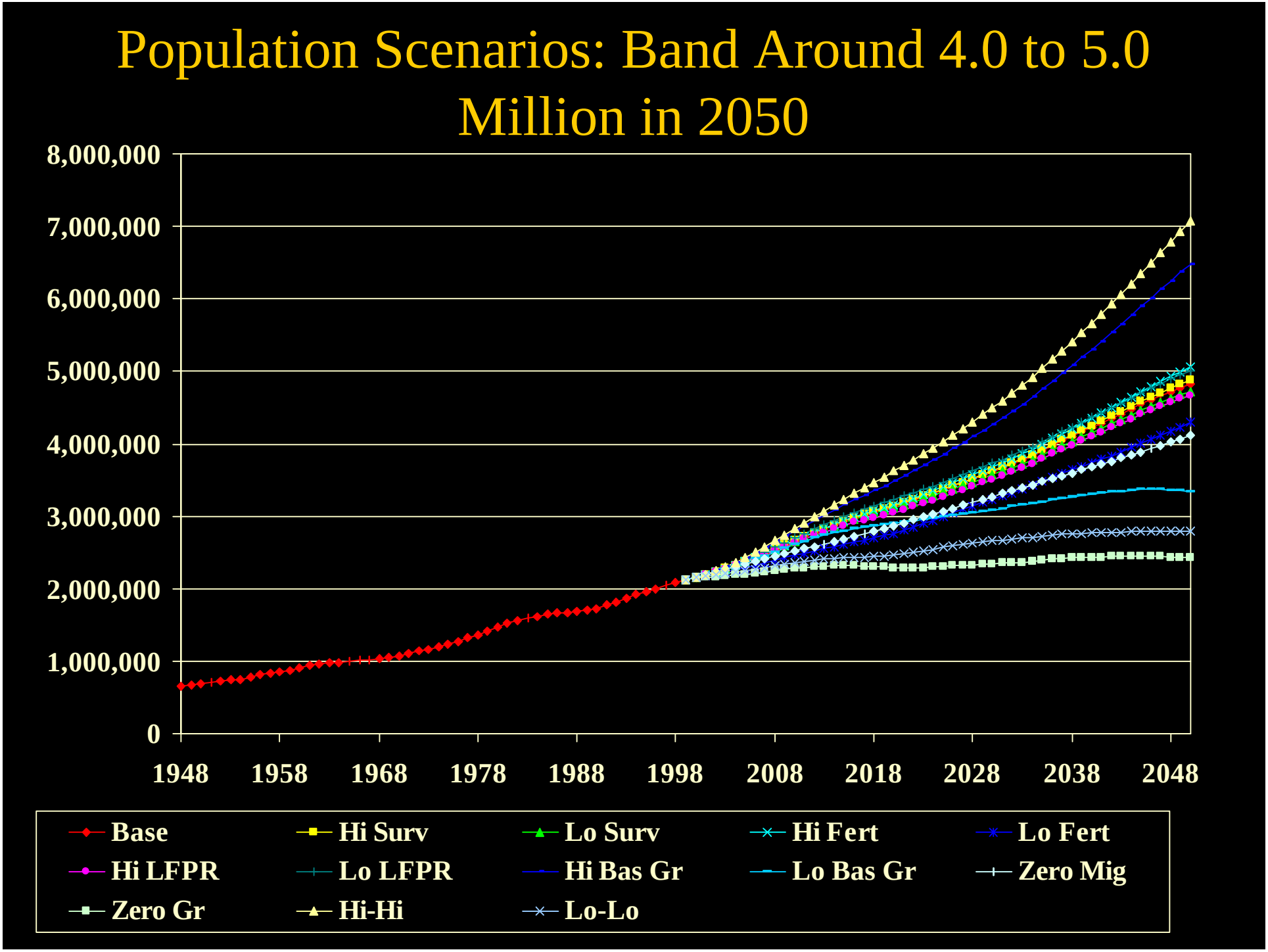


Ceterus Paribus Around the Base Case

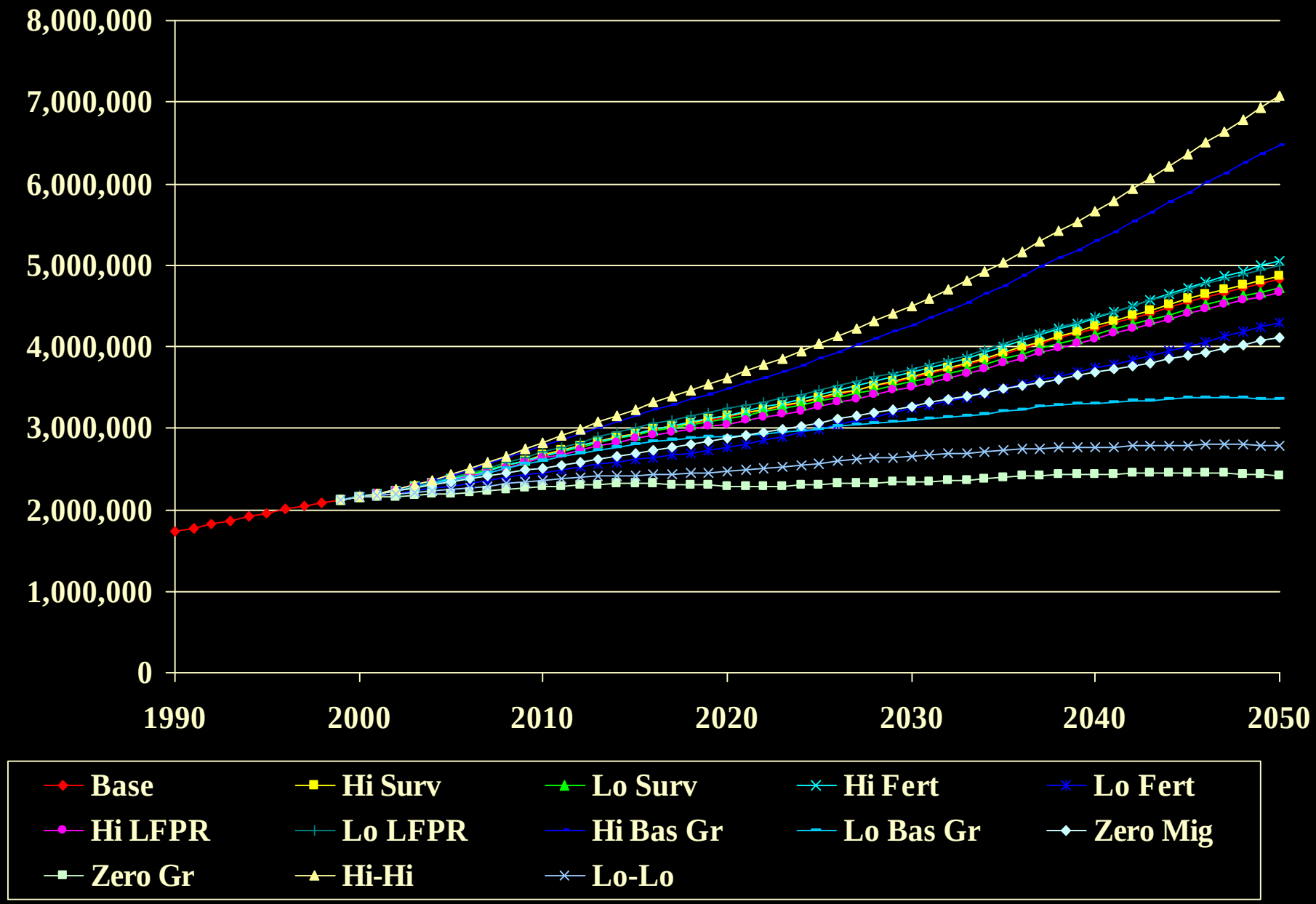
Thirteen Scenarios

- **Base Case**: Medium fertility, mortality, economic growth, and labor force participation rates
- **Eight Ceterus Paribus Change Cases**: Around base case, as illustrated in previous slide
- **Zero Migration**: Economic Growth just sufficient so there is zero net employment related in-migration
- **Zero Economic Growth**: No growth in basic (export sector) employment
- **High Population Case**: High Fertility, Survival, Economic Growth, & Low Labor Force Participation
- **Low Population Case**: Low Fertility, Survival, Economic Growth, & High Labor Force Participation

Population Scenarios: Band Around 4.0 to 5.0 Million in 2050



Population: Rates of Employment Growth Define Extremes

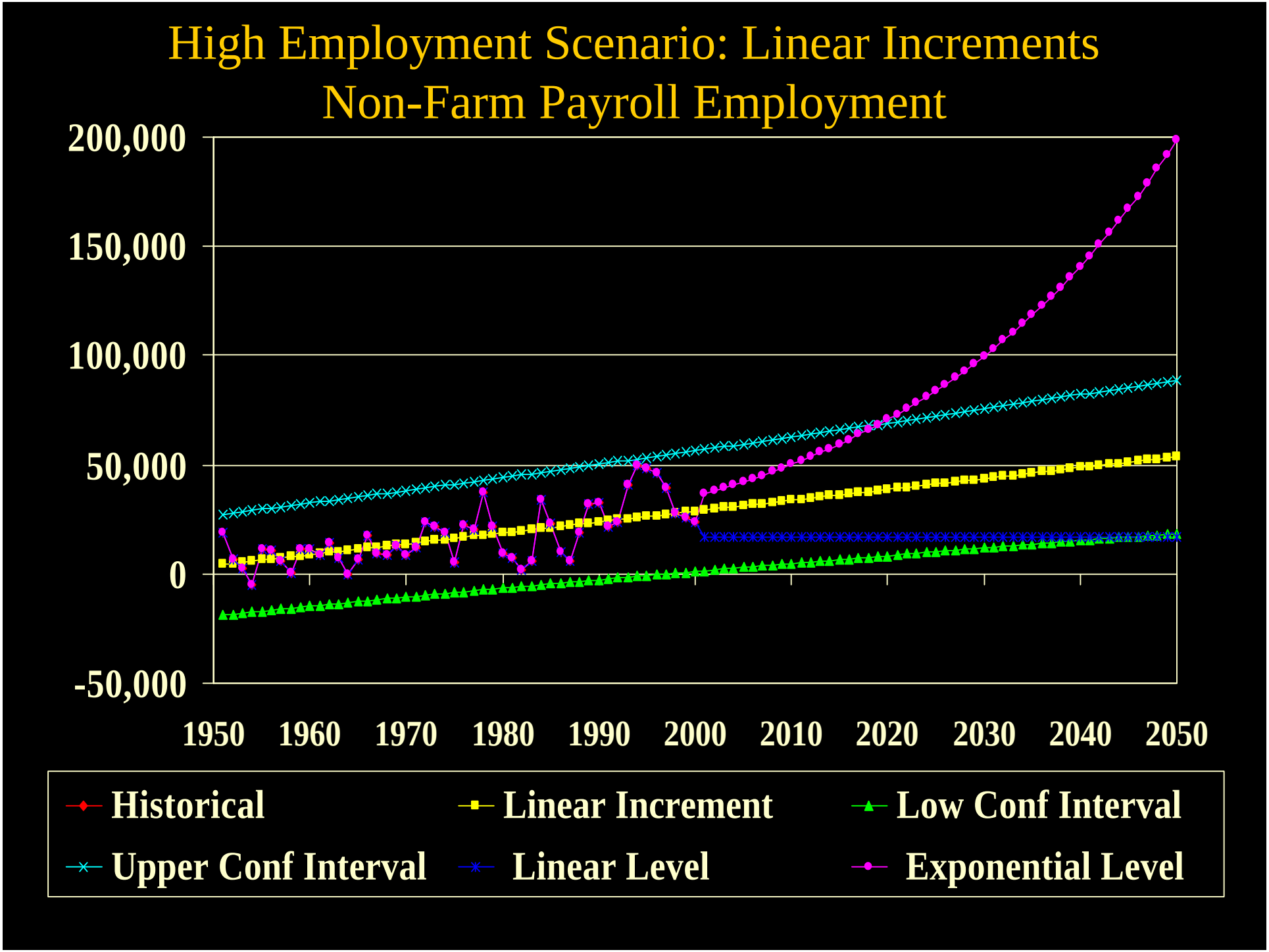


Employment Growth Scenarios

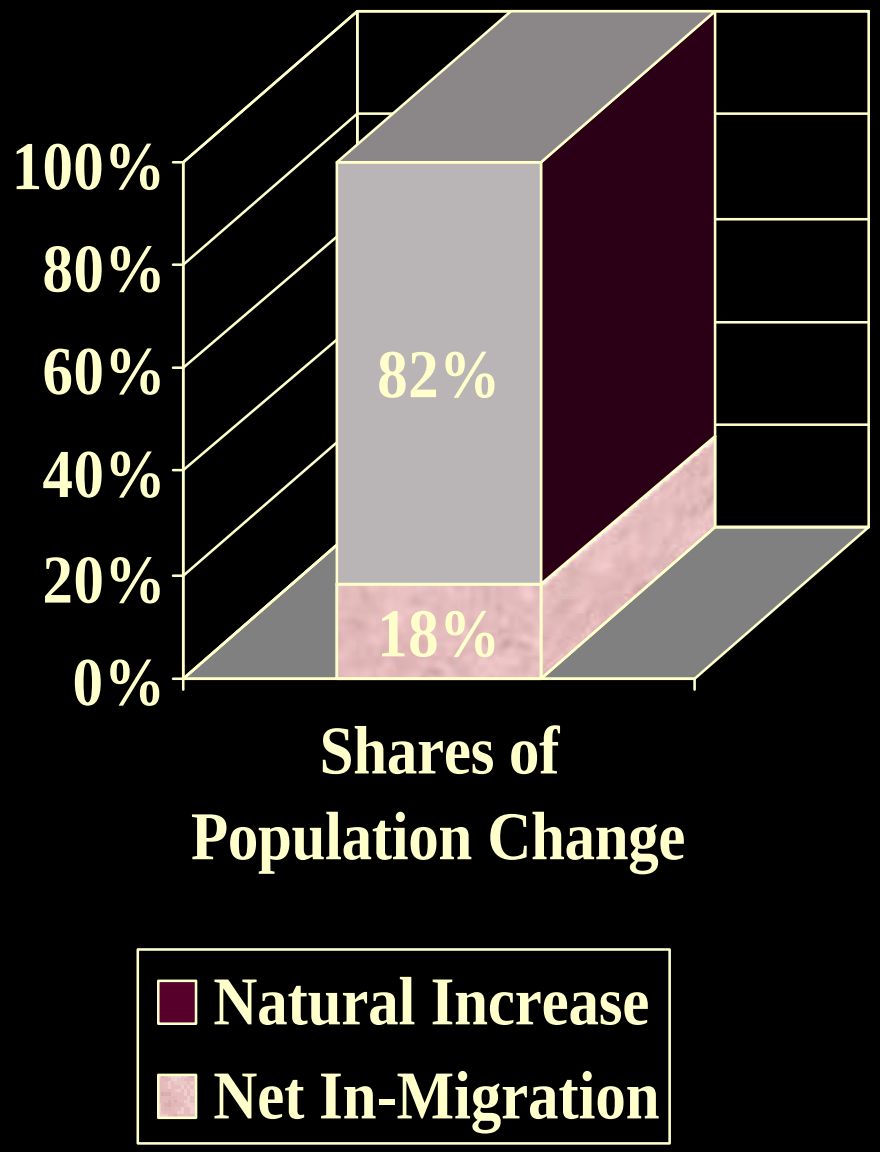
- Employment growth is the driver of the long run population path -- it sets the extremes for total population in this analysis.
- These employment scenarios are based upon analyses of the State's fifty year employment history.
- The future employment paths include the State's short run forecast through 2000.
- The long-run employment scenarios start in the year 2001.

Five Employment Growth Cases

- **High Growth**: Increasing linear increments to employment
- **Medium Growth**: Employment growth sufficient to generate cumulative net in-migration of 18% of the population increase from 1999 - 2050
- **Low Growth**: Symmetrical employment growth with high employment around medium path
- **Zero In-Migration**: Employment growth that generates zero net migration
- **Zero Basic Employment Growth**: Constant basic employment level through time


High Employment Scenario: Linear Increments
Non-Farm Payroll Employment
200,000
150,000
100,000
50,000
0
-50,000
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
Historical
Linear Increment
Low Conf Interval
Upper Conf Interval
Linear Level
Exponential Level

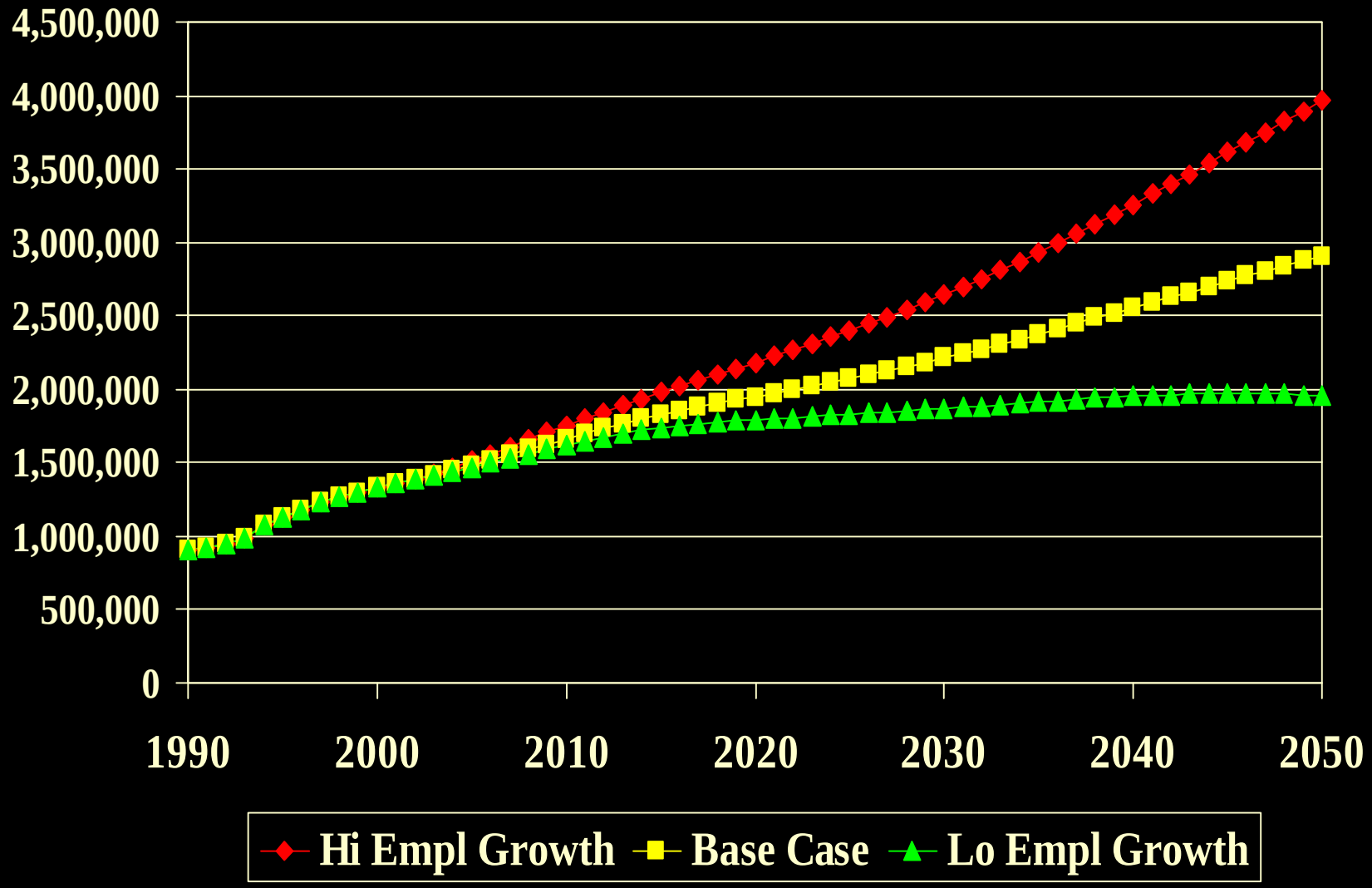
Medium Employment Case



- Net in-migration contributed 18% of population increase from 1948 - 1998.
- Medium Case: Employment growth is sufficient to generate the same relative component contributions for 1999 - 2050.

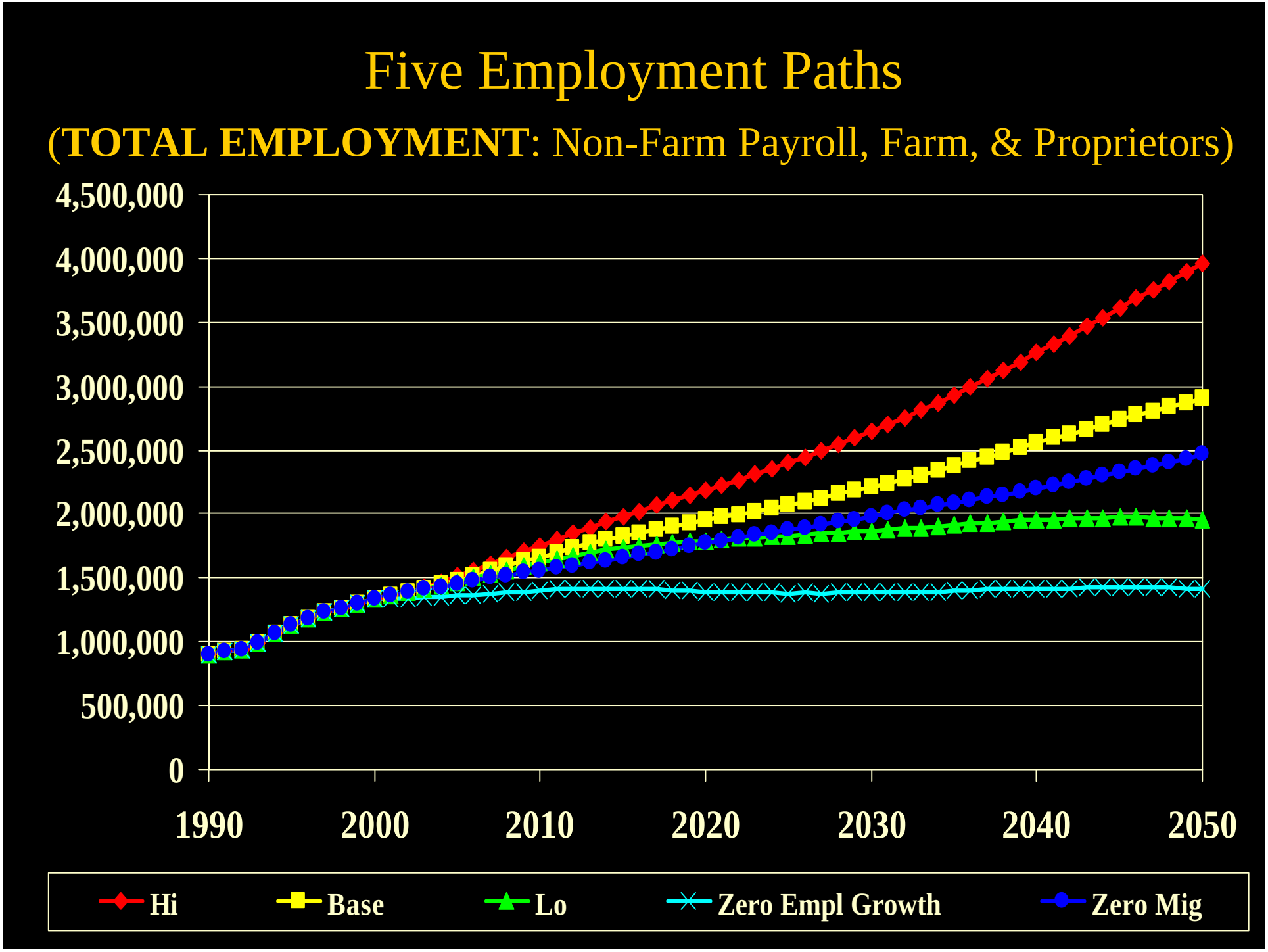
Low Employment Growth: Create Symmetrical Low Path

(**TOTAL EMPLOYMENT**: Non-Farm Payroll, Farm, & Proprietors)

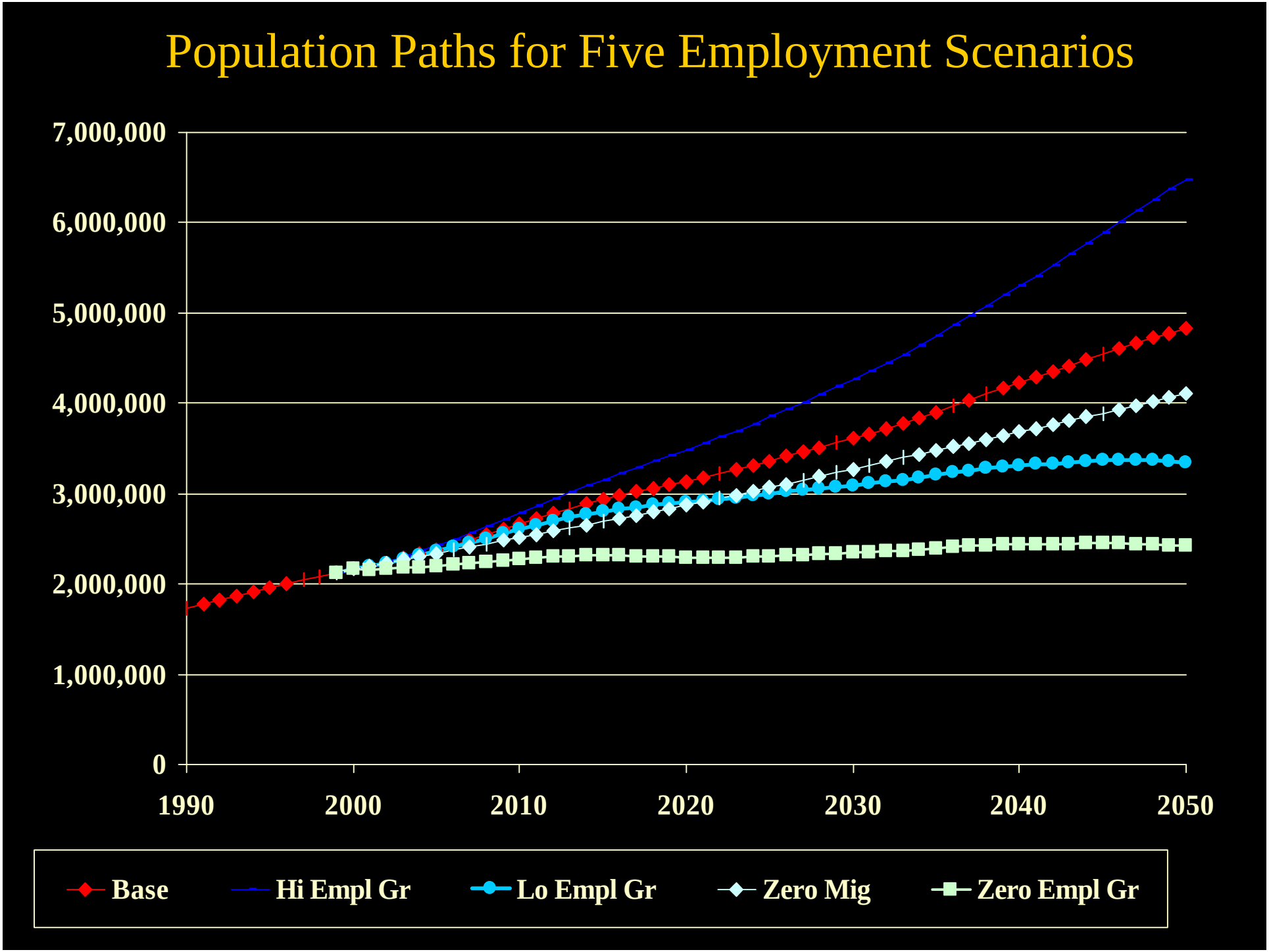


Five Employment Paths

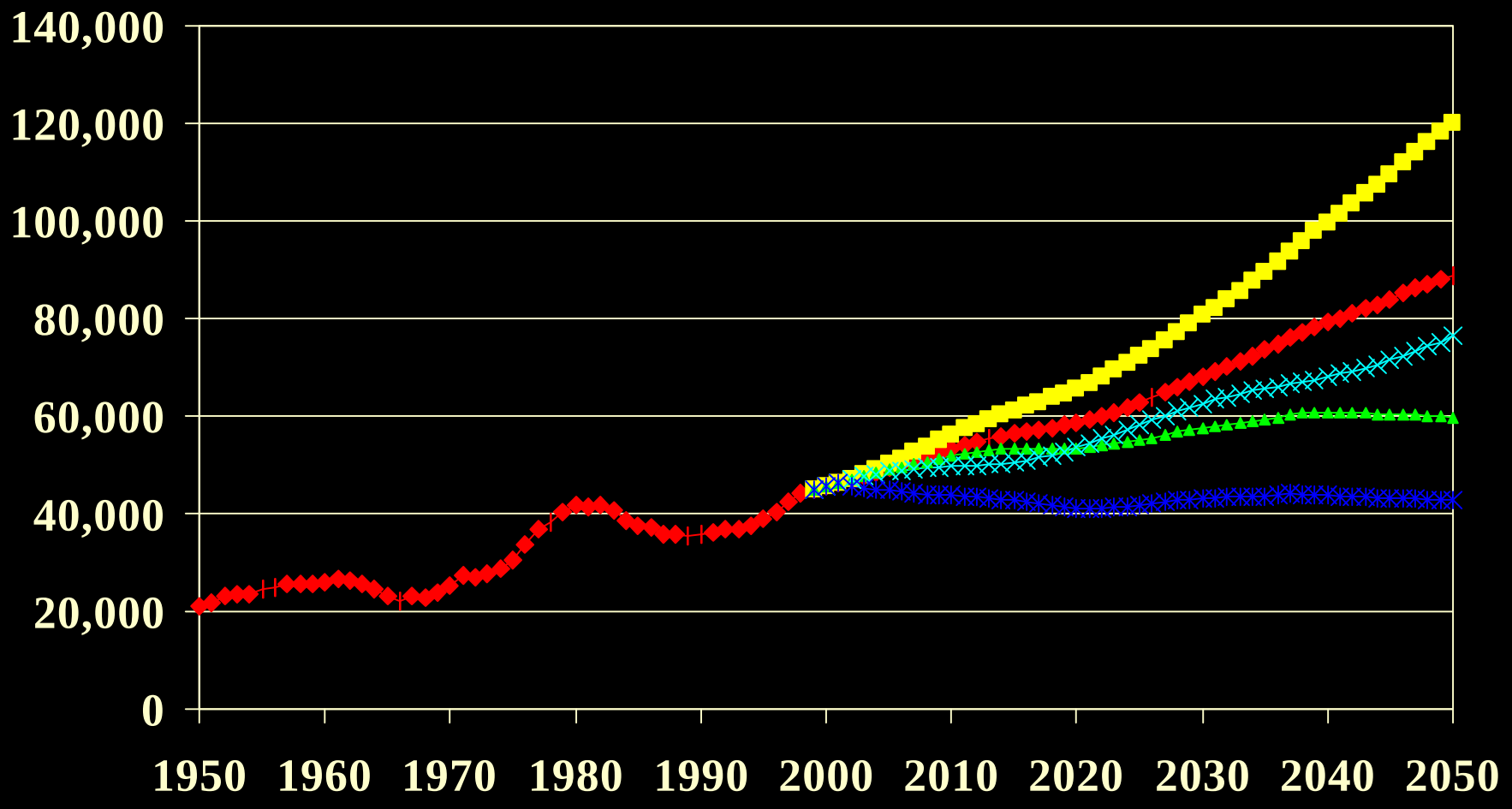
(**TOTAL EMPLOYMENT**: Non-Farm Payroll, Farm, & Proprietors)



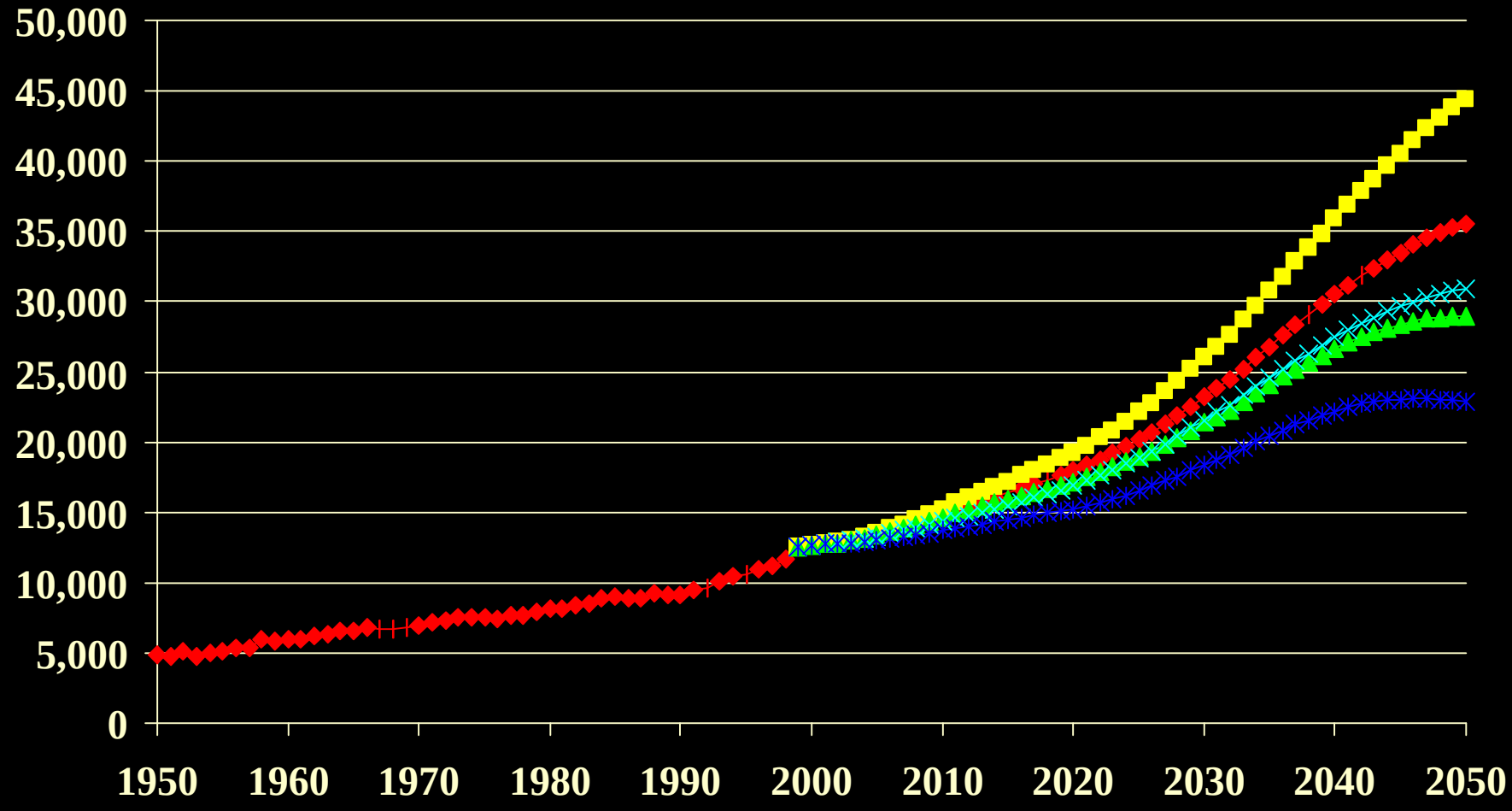
Population Paths for Five Employment Scenarios



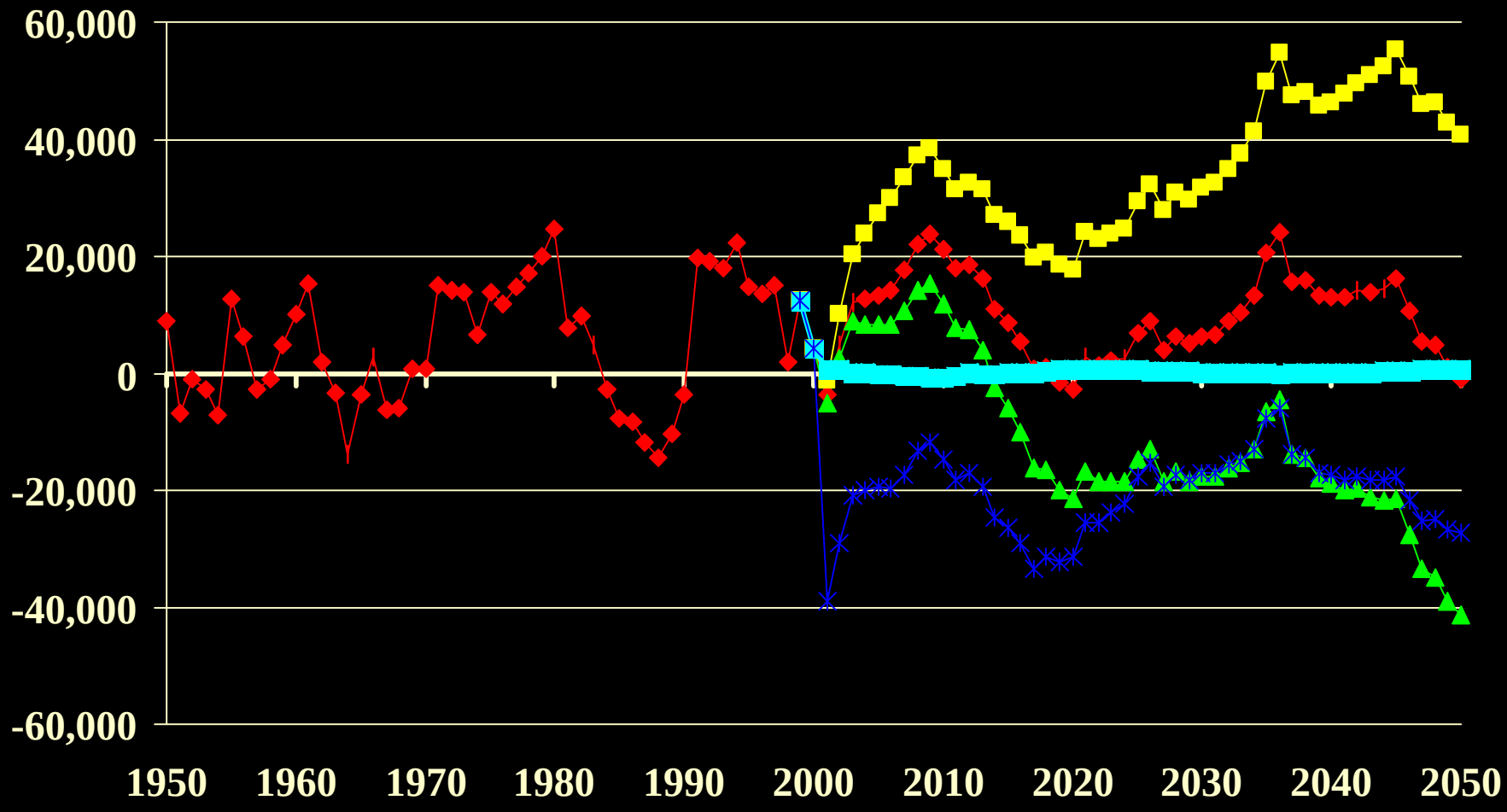
Births: Five Employment Scenarios



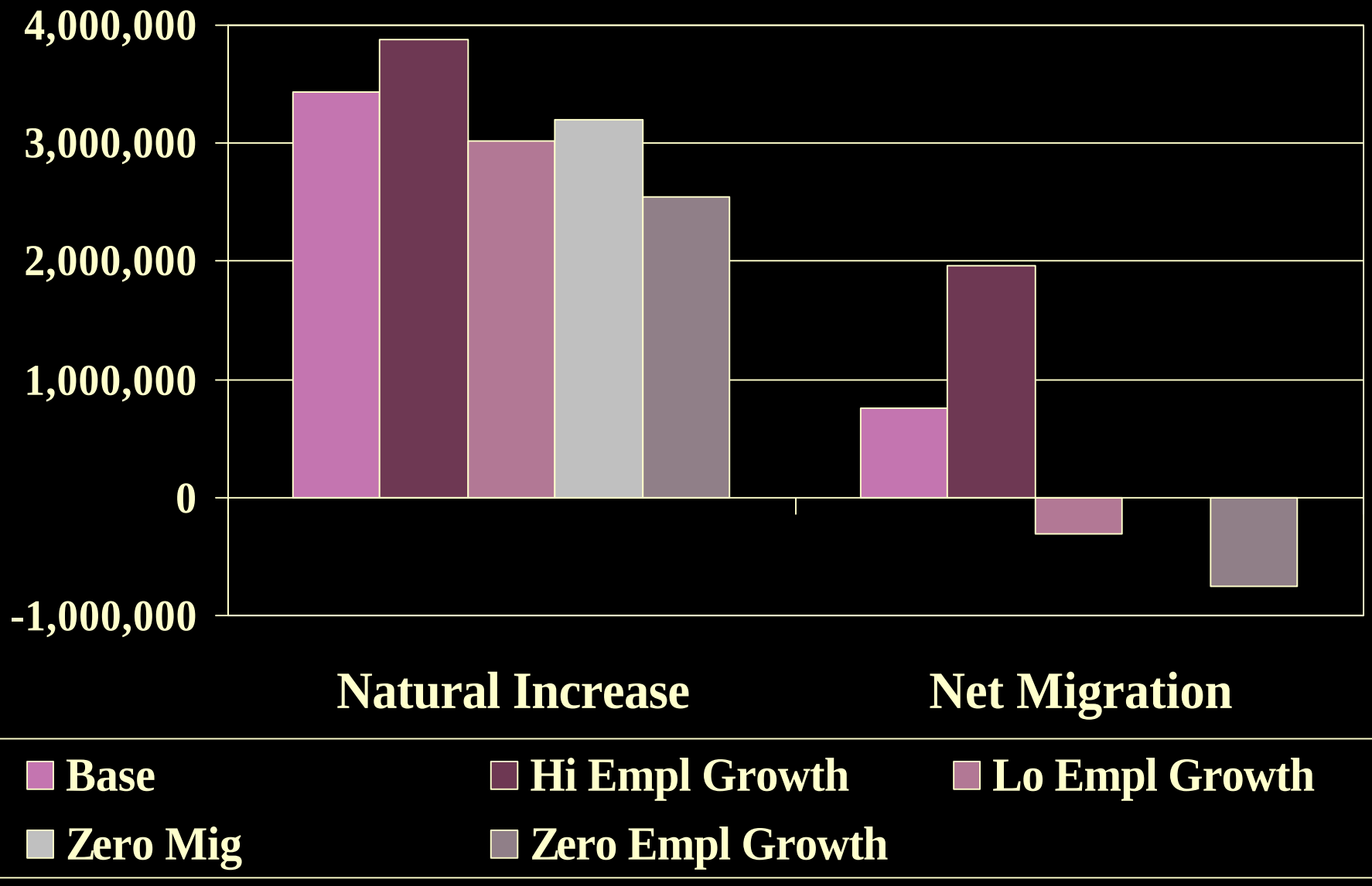
Deaths: Five Employment Scenarios



Residual Migration: Five Employment Scenarios



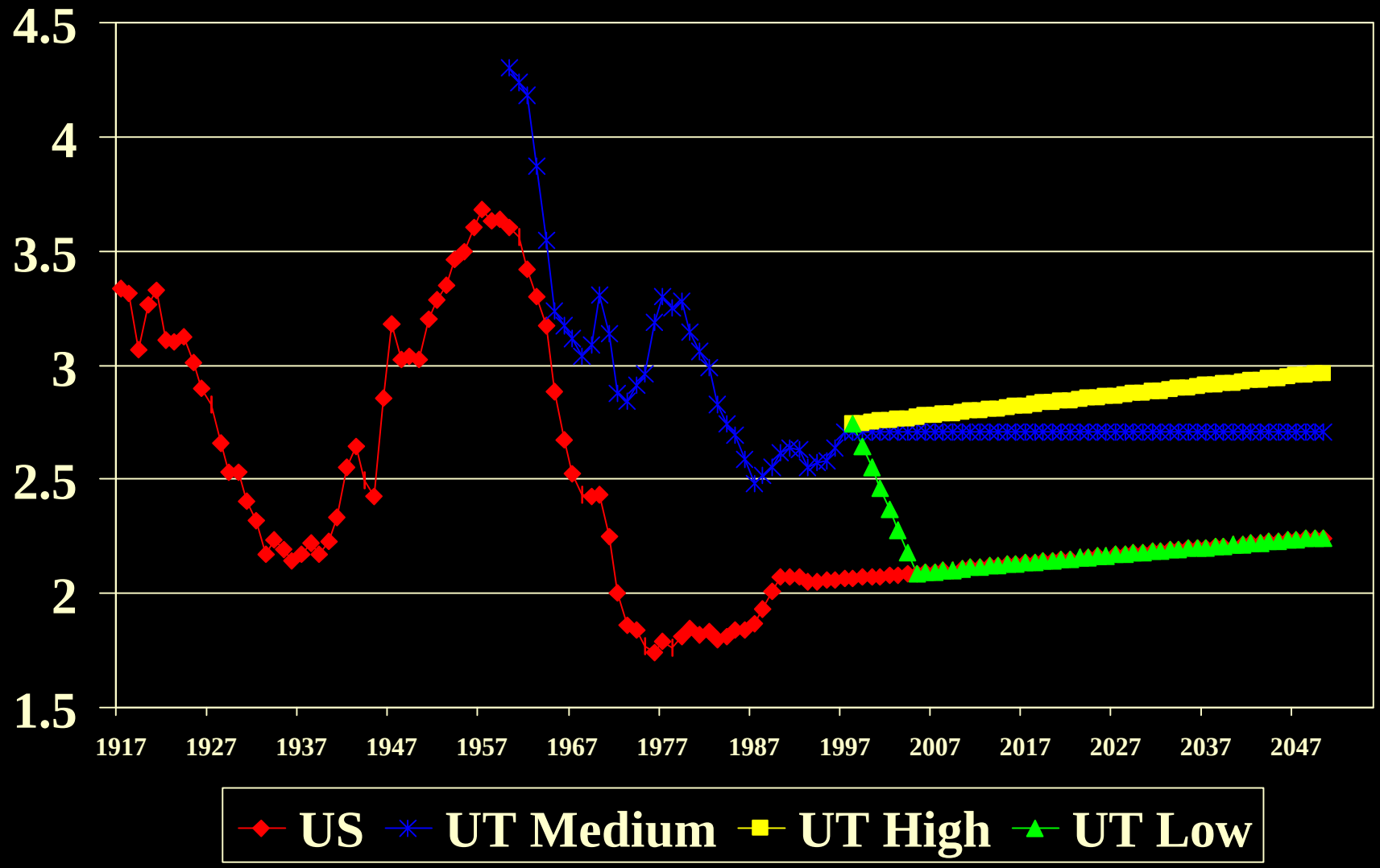
Cumulative Components of Population Change: 1999 - 2050 for Employment Scenarios

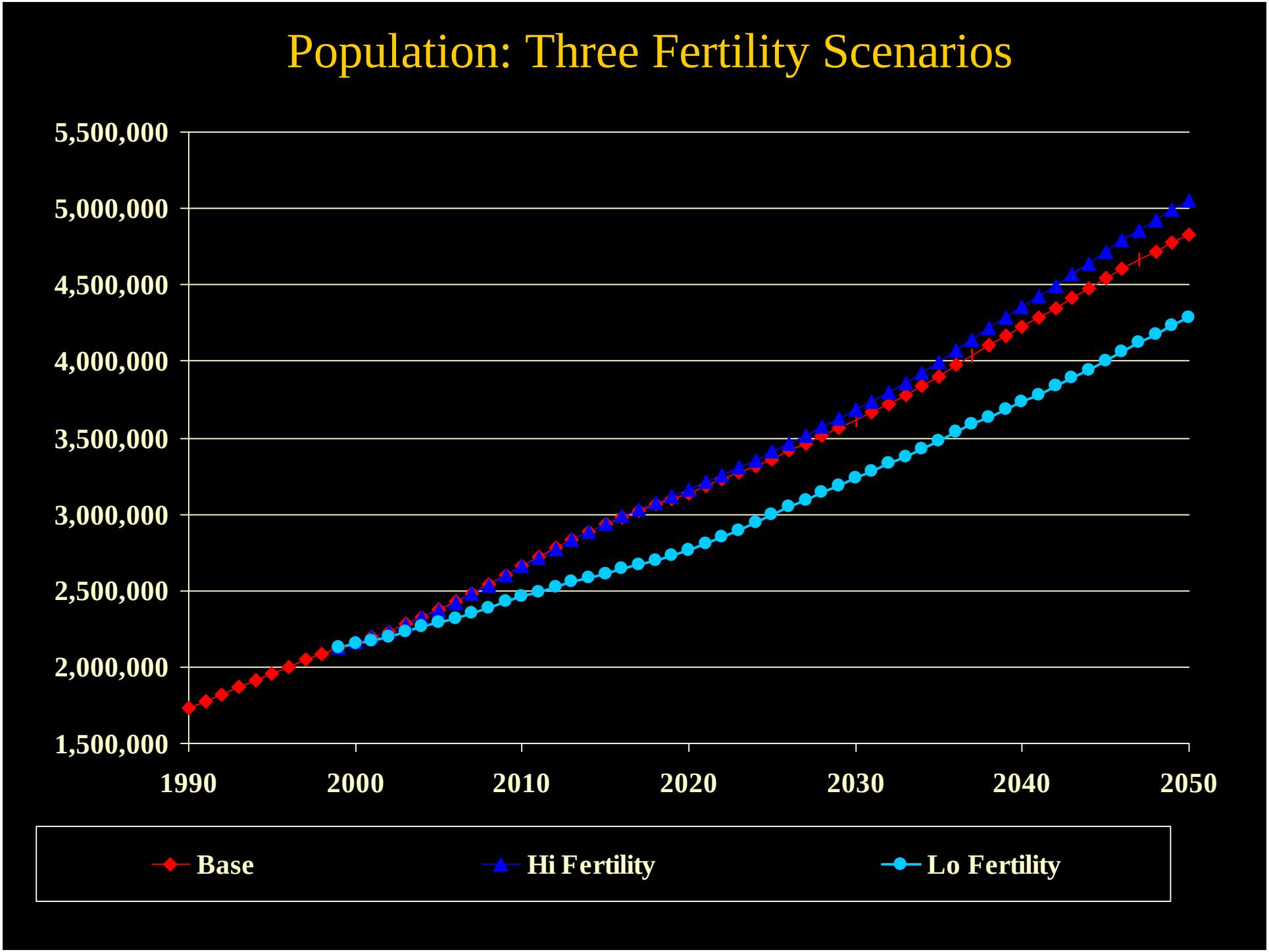


Three Fertility Cases

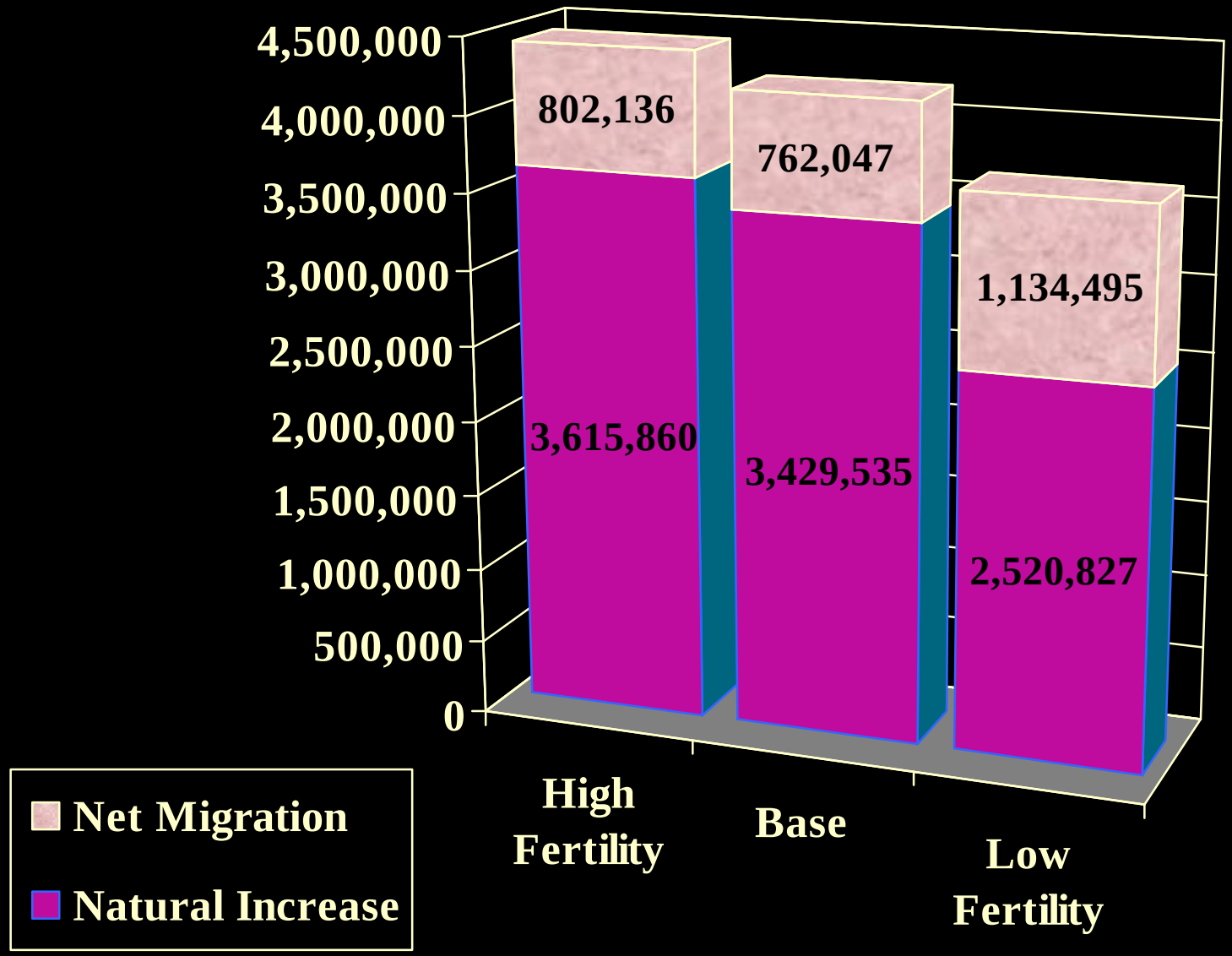
- **Low Fertility**: Converge to projected national total fertility rate by 2005
- **Medium Fertility**: Constant at 1998 rates - 2.6 for Utah vs. about 2.0 for U.S.
- **High Fertility**: Maintain the difference in fertility rates (observed in 1990) between Utah and the U.S. with the national projections from 1999 to 2050.

Historical and Projected Total Fertility Rates for Utah and the U.S.

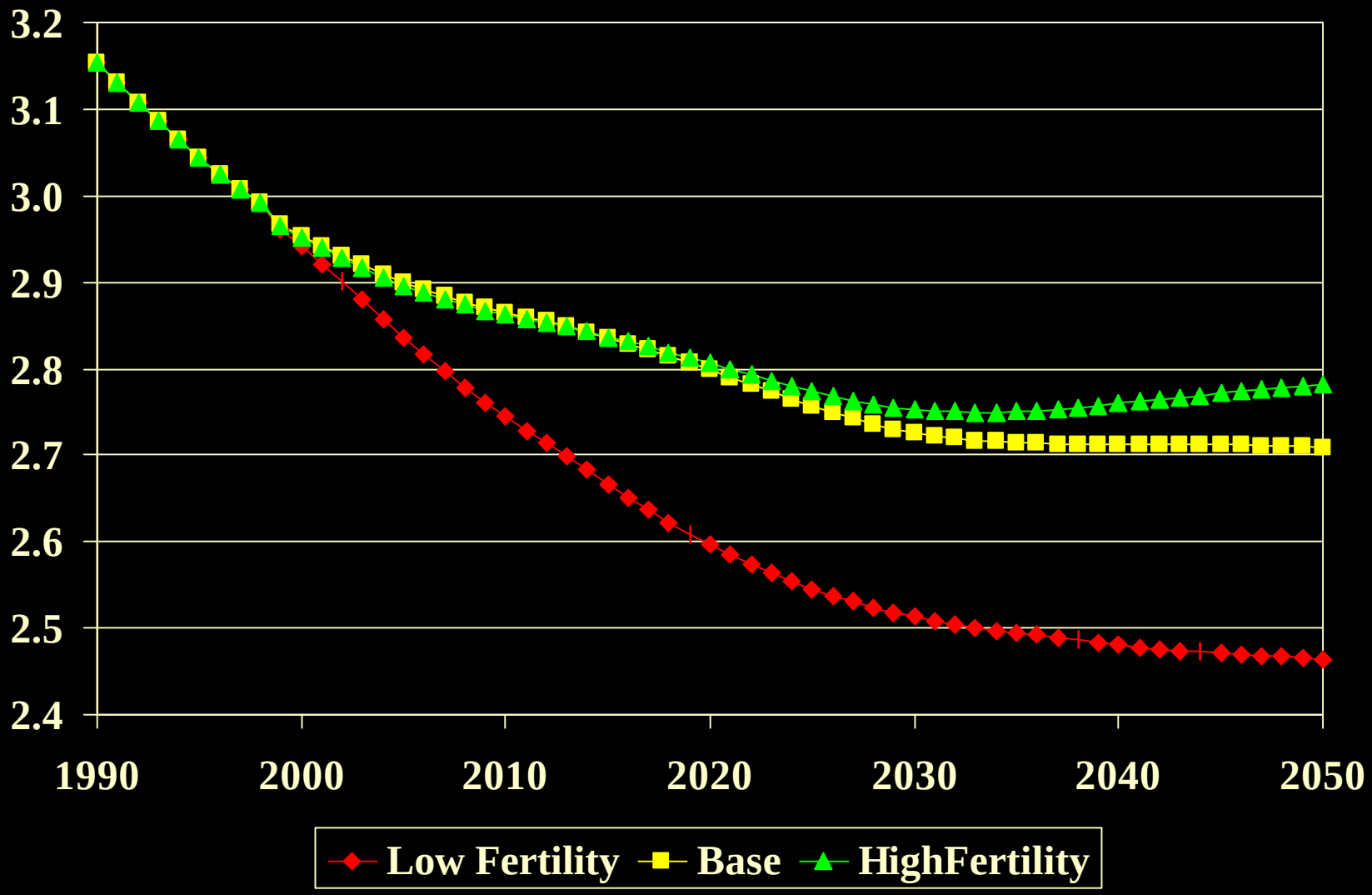



Population: Three Fertility Scenarios
5,500,000
5,000,000
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1990
2000
2010
2020
2030
2040
2050
Base
Hi Fertility
Lo Fertility

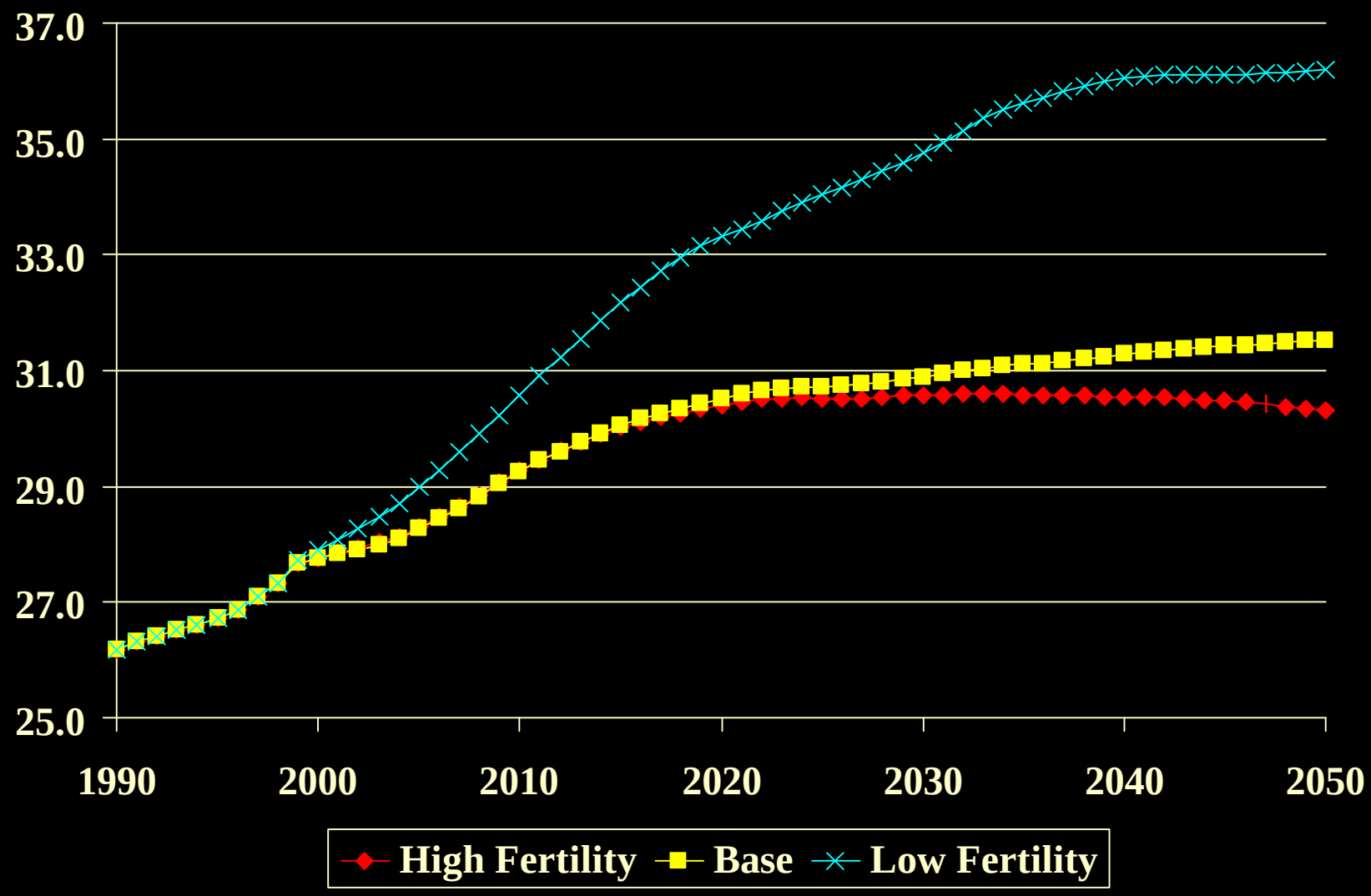
Cumulative Population Change 1999-2050: Fertility Scenarios



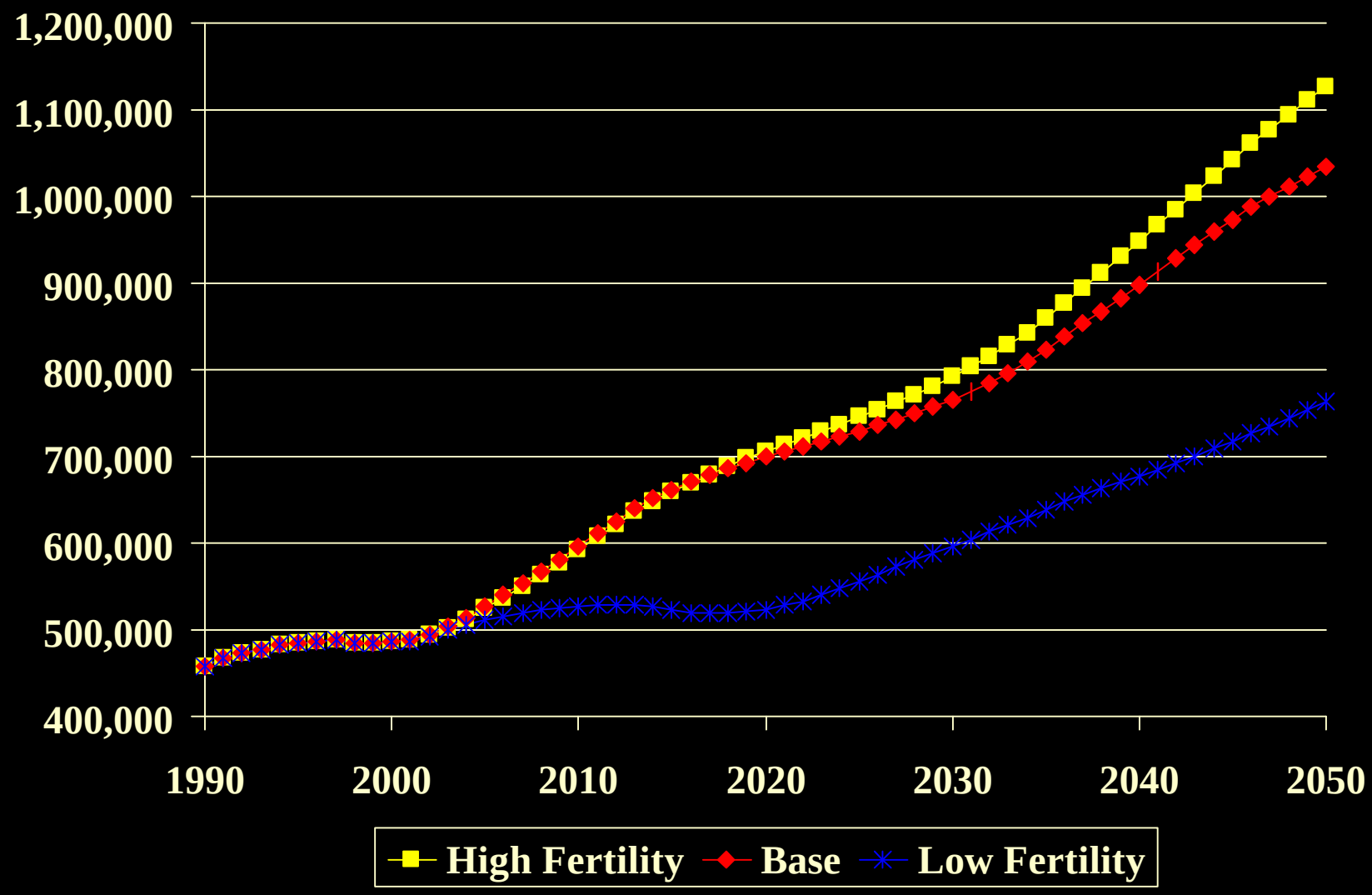
Persons per Household: Three Fertility Cases



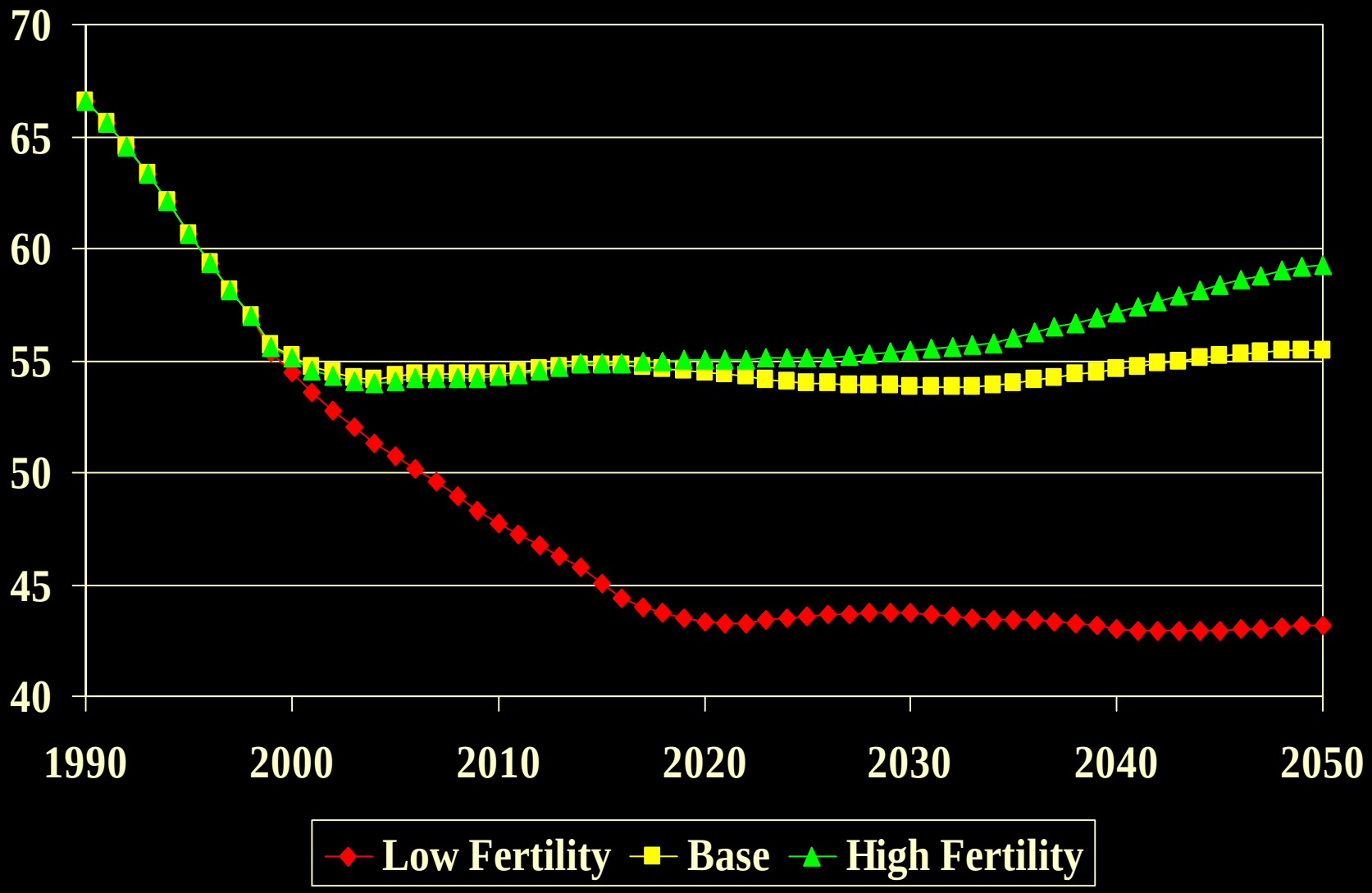
Median Age: Three Fertility Cases



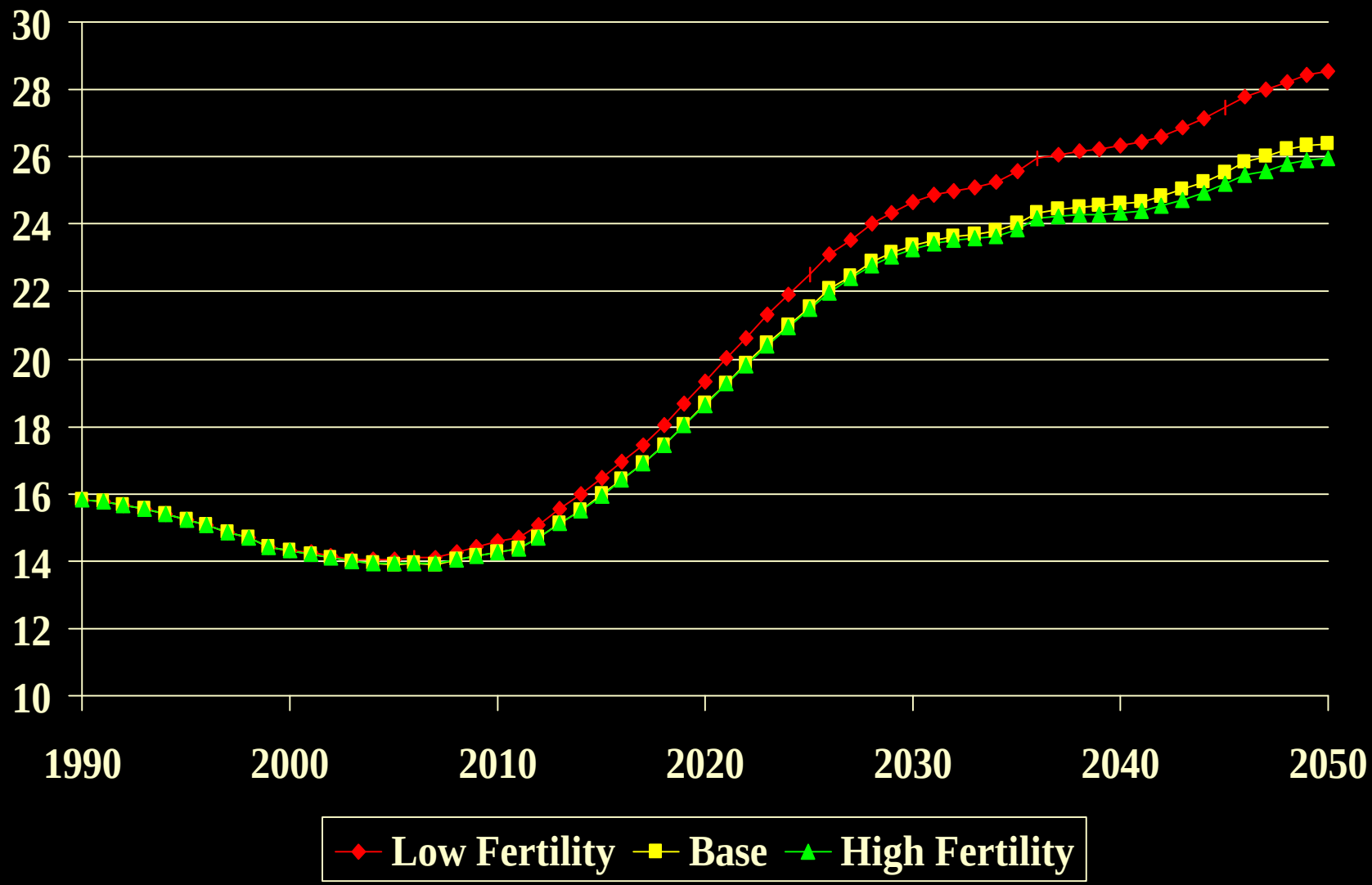
School Age Population (5-17): Three Fertility Cases



Number of Persons Less Than 18 Years Old per 100 Persons 18 to 65 Years Old: Three Fertility Cases

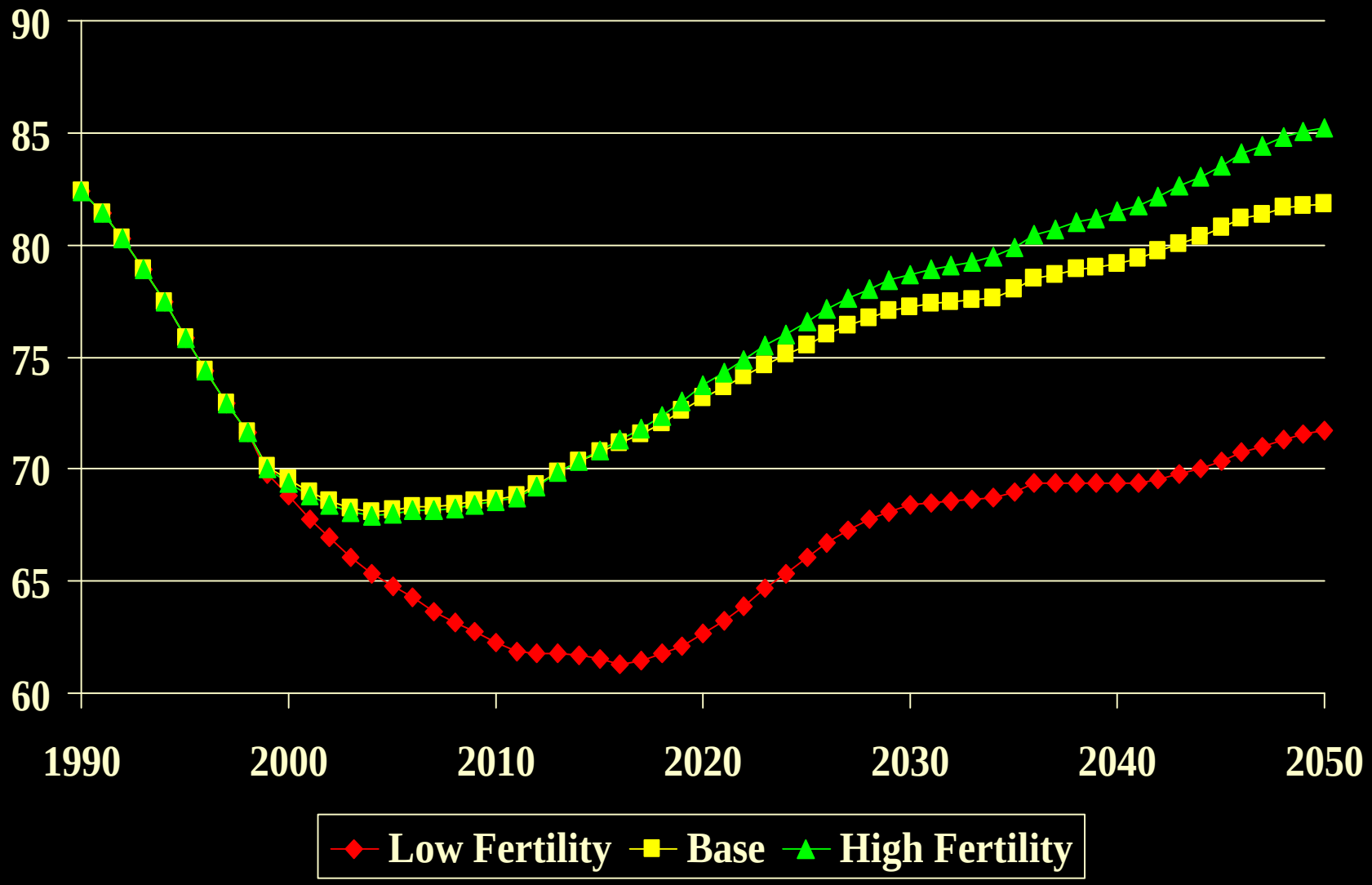


Number of Persons 65 Years & Older per 100 Persons 18 to 65 Years Old: Three Fertility Cases



Total Dependency Ratio: Three Fertility Cases

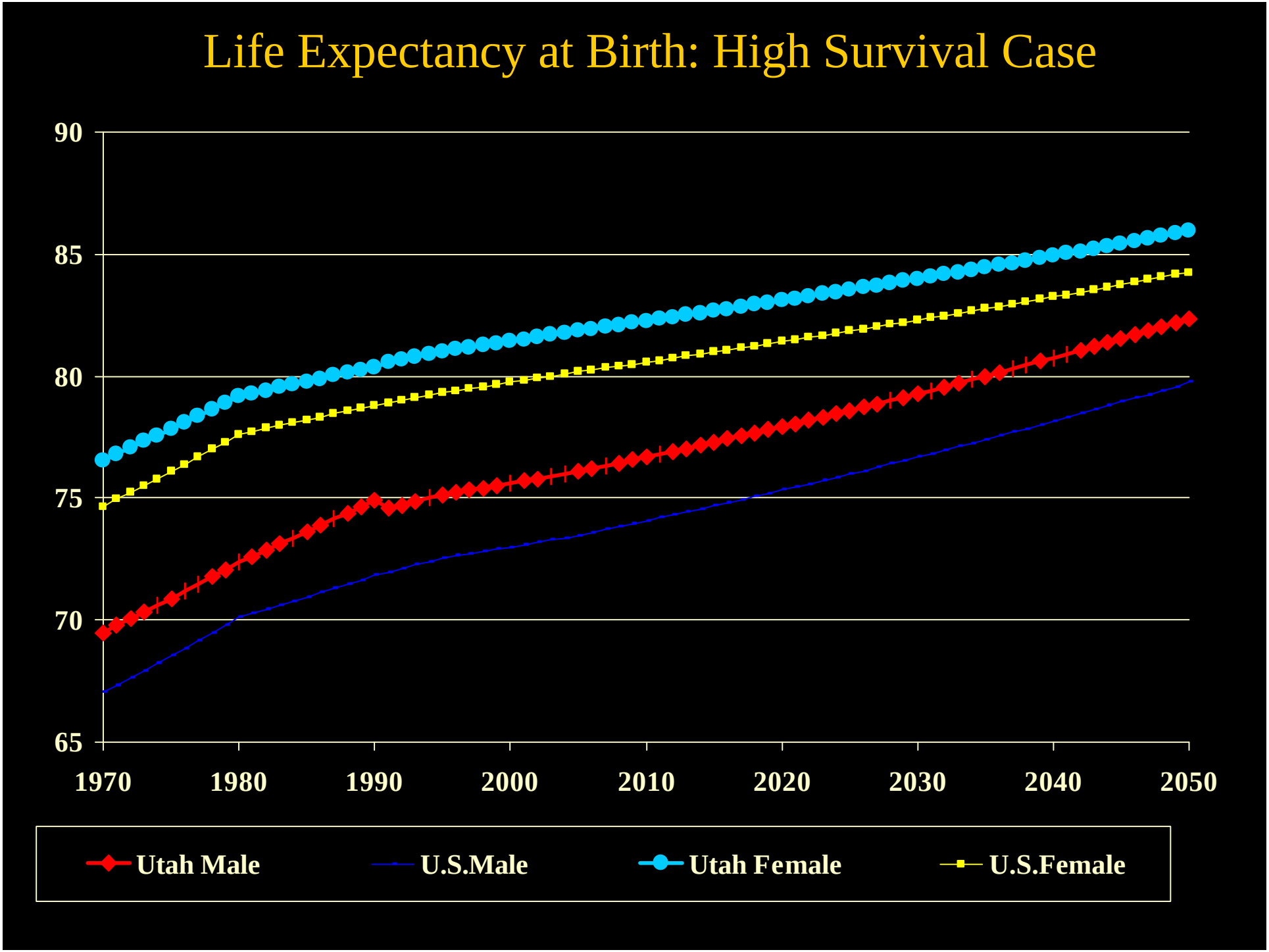
Number of Persons Less Than 18 Plus those 65 Years and Older Per 100 Persons 18 to 65 Years Old



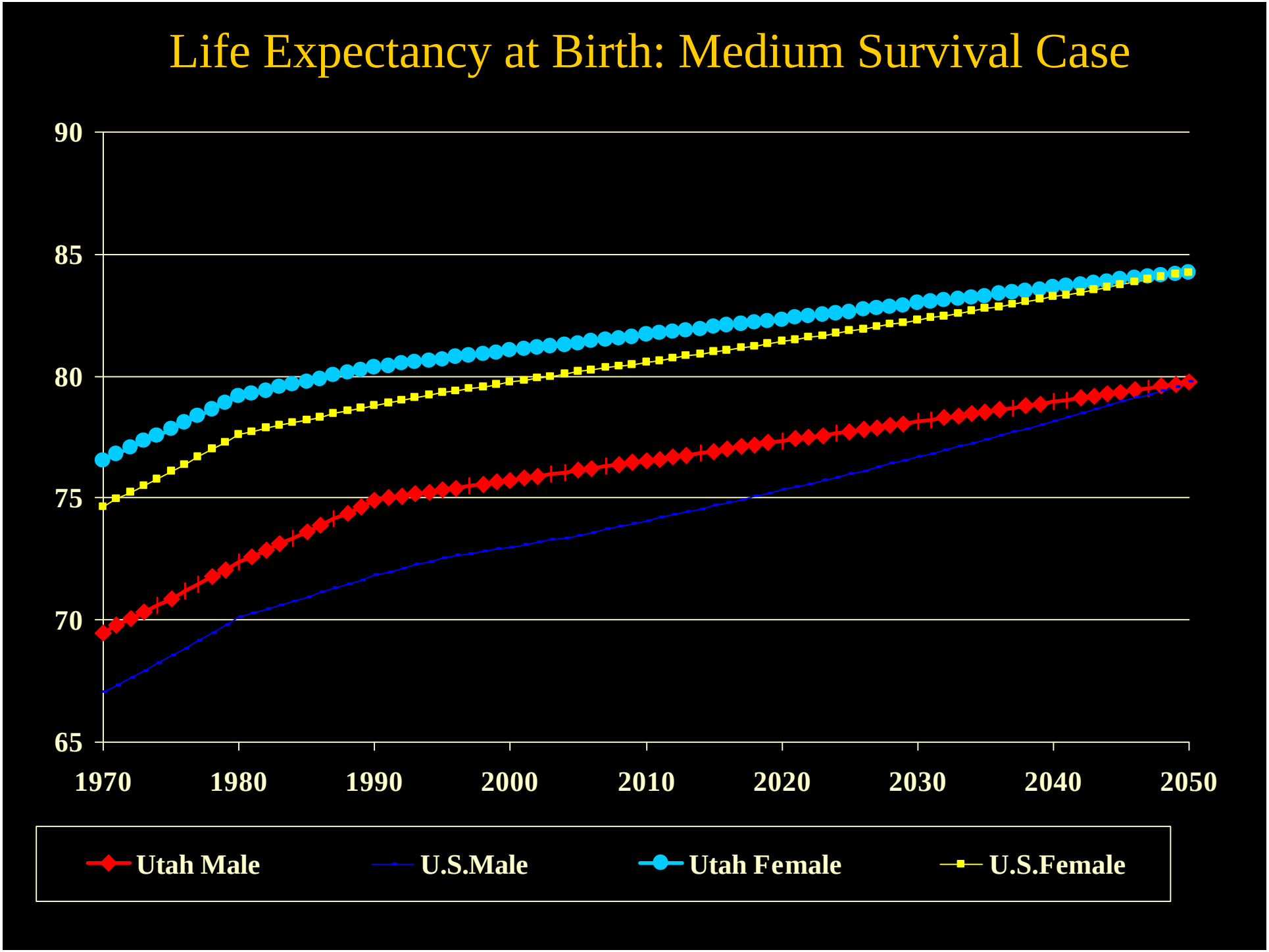
Survival Scenarios

- **Low**: Survival Rates and life expectancy held constant at 1990 rates
- **Medium**: Converge to US rates by 2050
- **High**: Maintain mean difference in life expectancy observed in 1970, 1980, and 1990 over projection interval. Projected US is Census middle series.

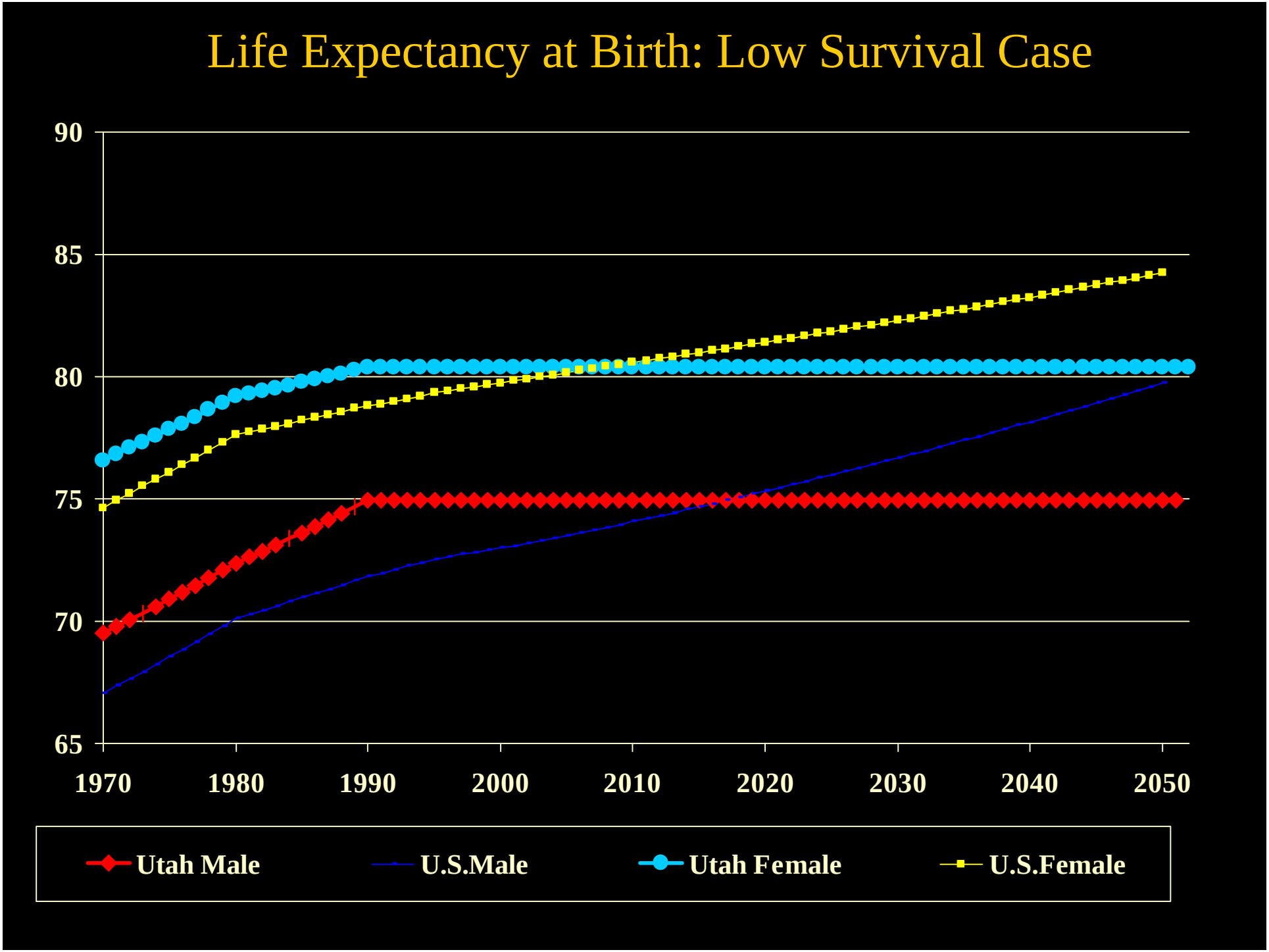
Life Expectancy at Birth: High Survival Case

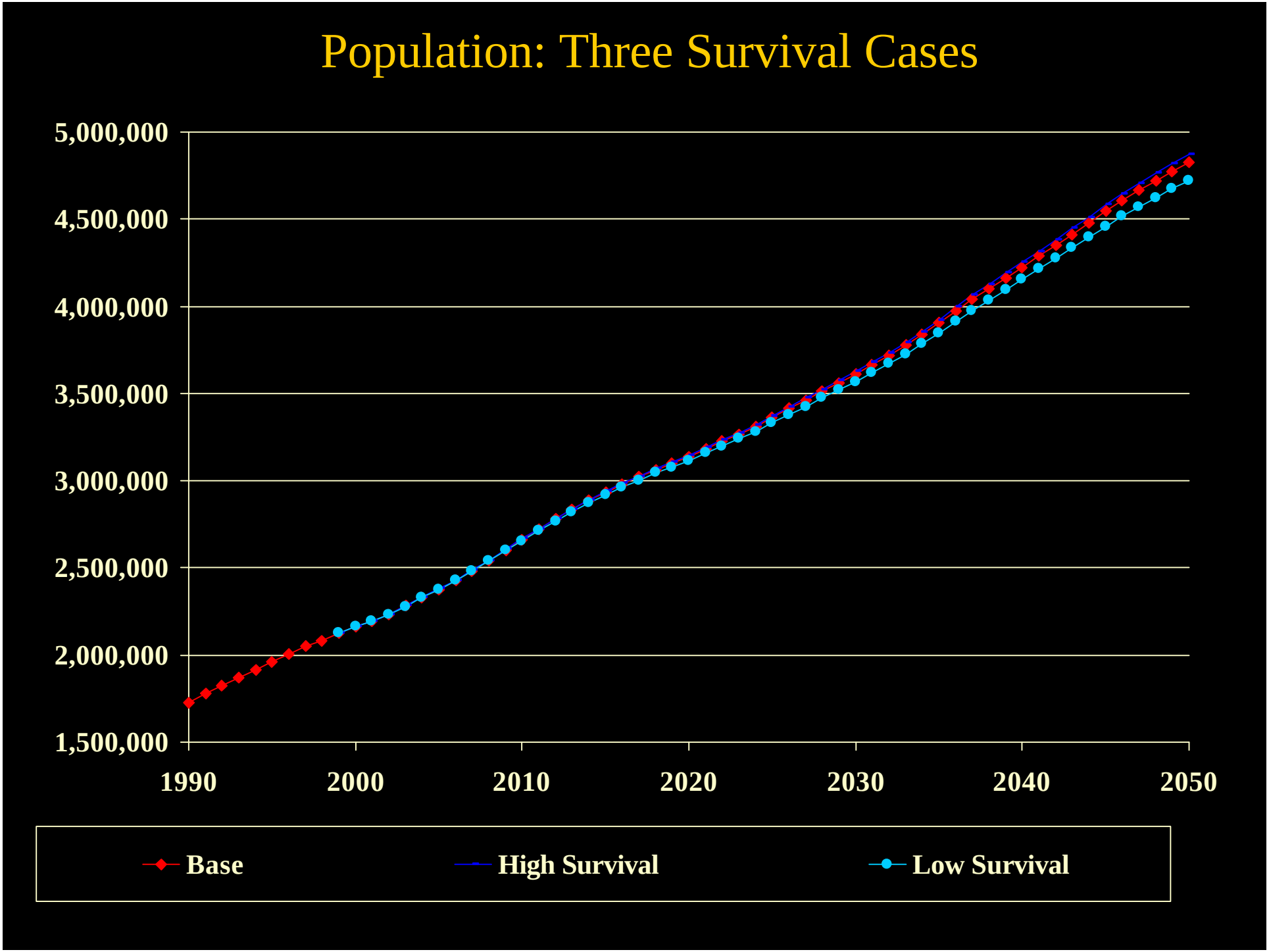


Life Expectancy at Birth: Medium Survival Case

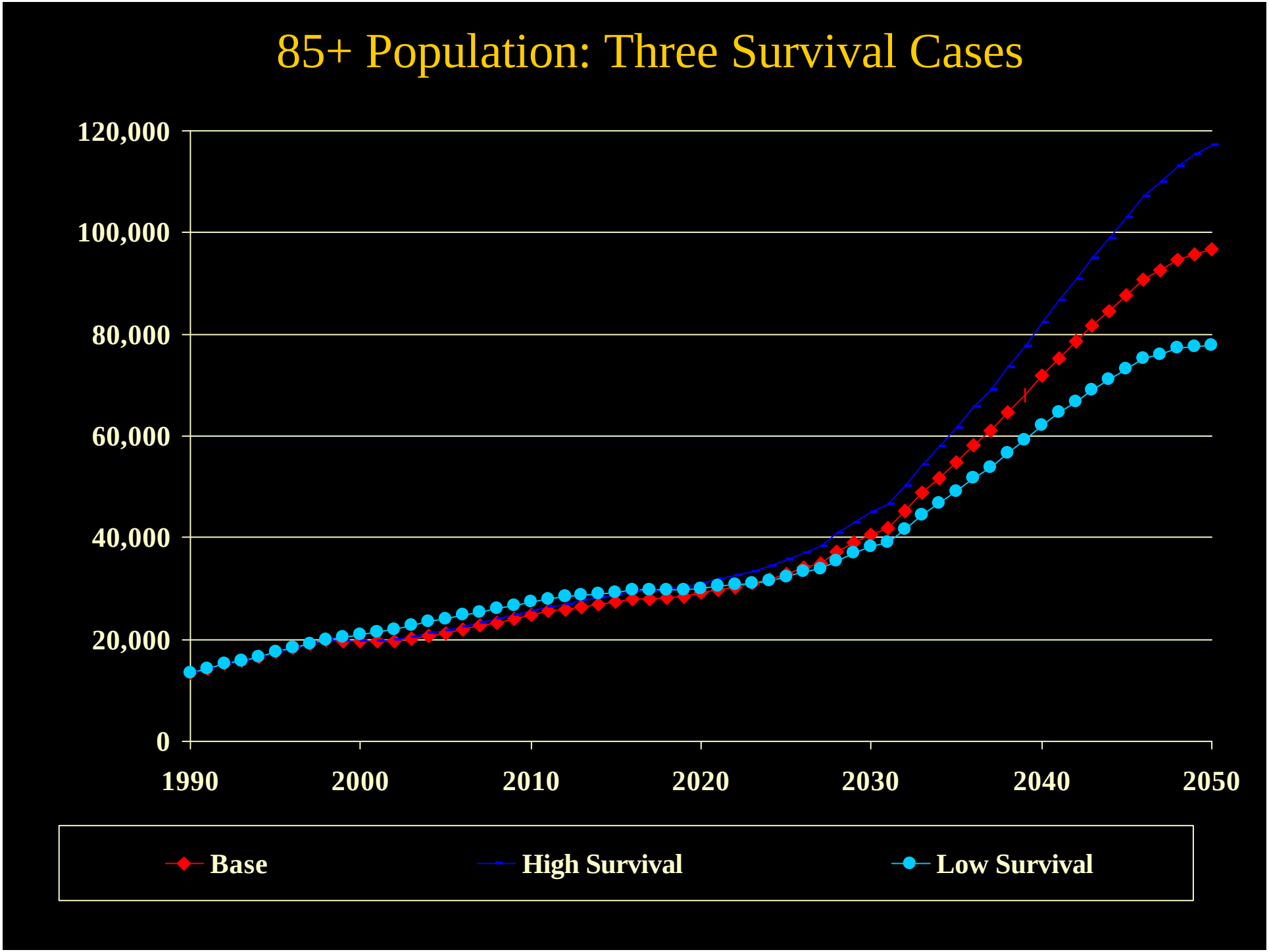


Life Expectancy at Birth: Low Survival Case

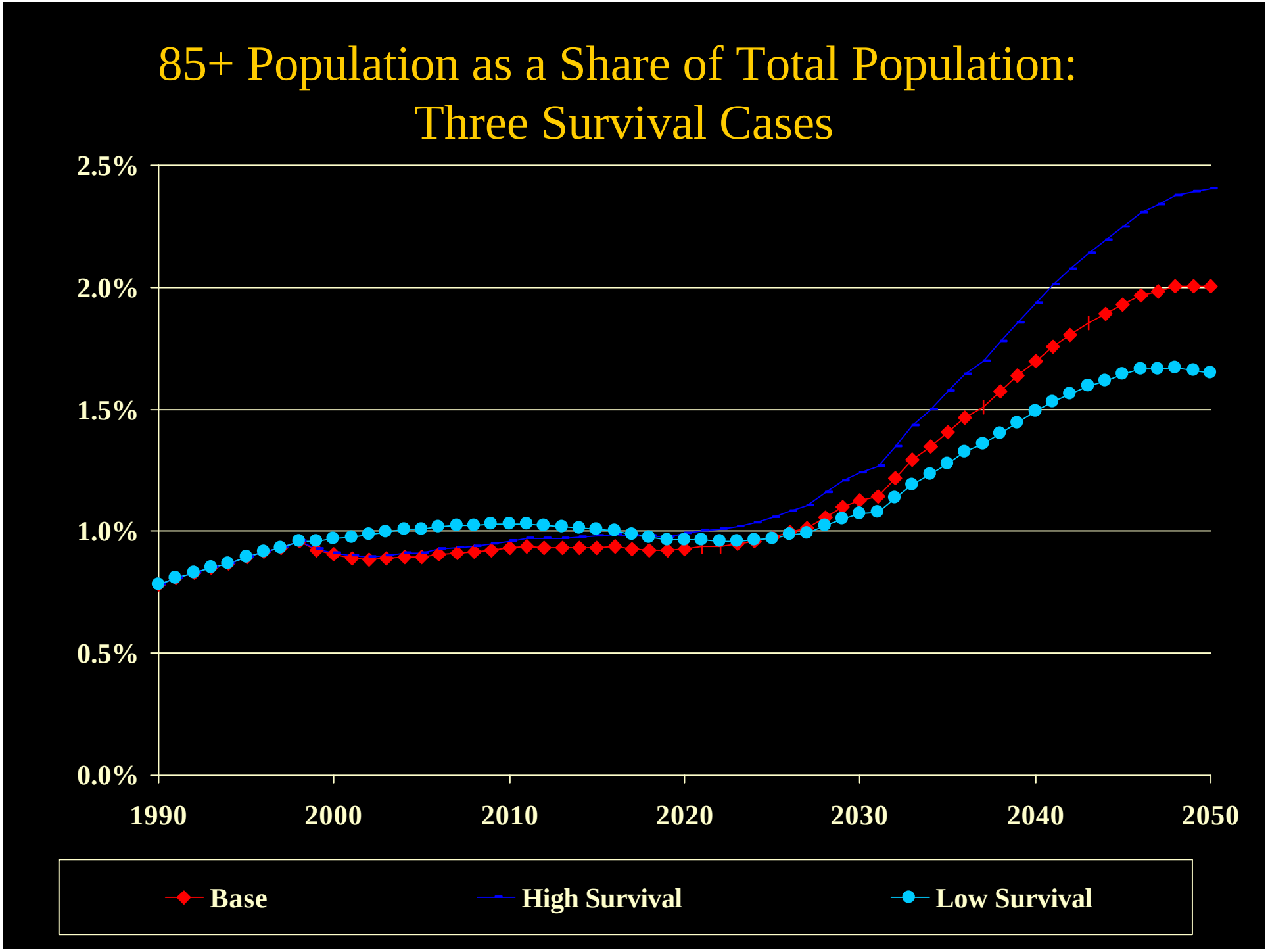



Population: Three Survival Cases
5,000,000
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1990
2000
2010
2020
2030
2040
2050
Base
High Survival
Low Survival

85+ Population: Three Survival Cases



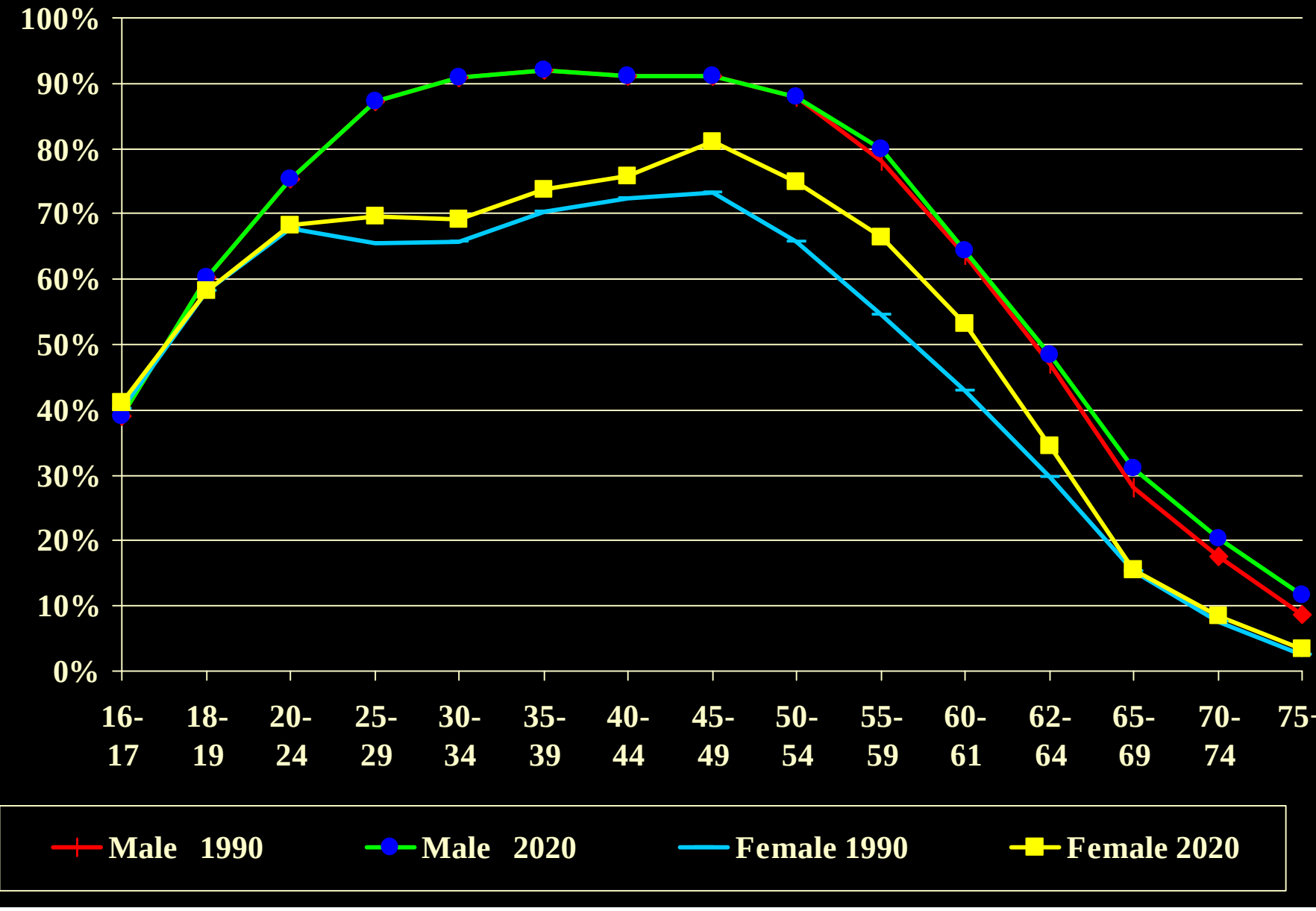
85+ Population as a Share of Total Population: Three Survival Cases



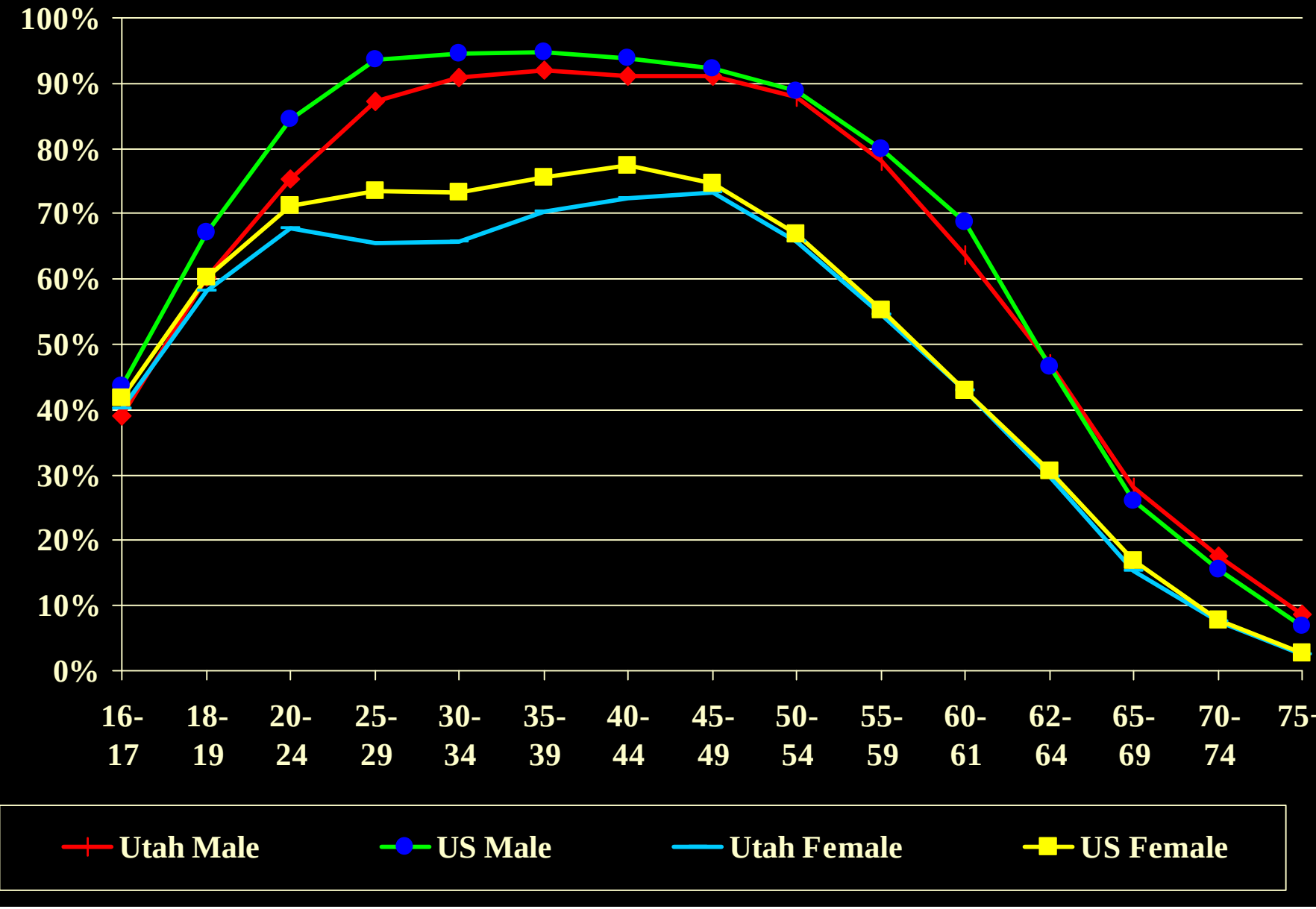
Labor Force Participation Rate Cases

- **Low Case**: 5% less than the medium case
- **Medium Case**: Maintain relative differences with US series.
- **High Case**: 5% greater than the medium case

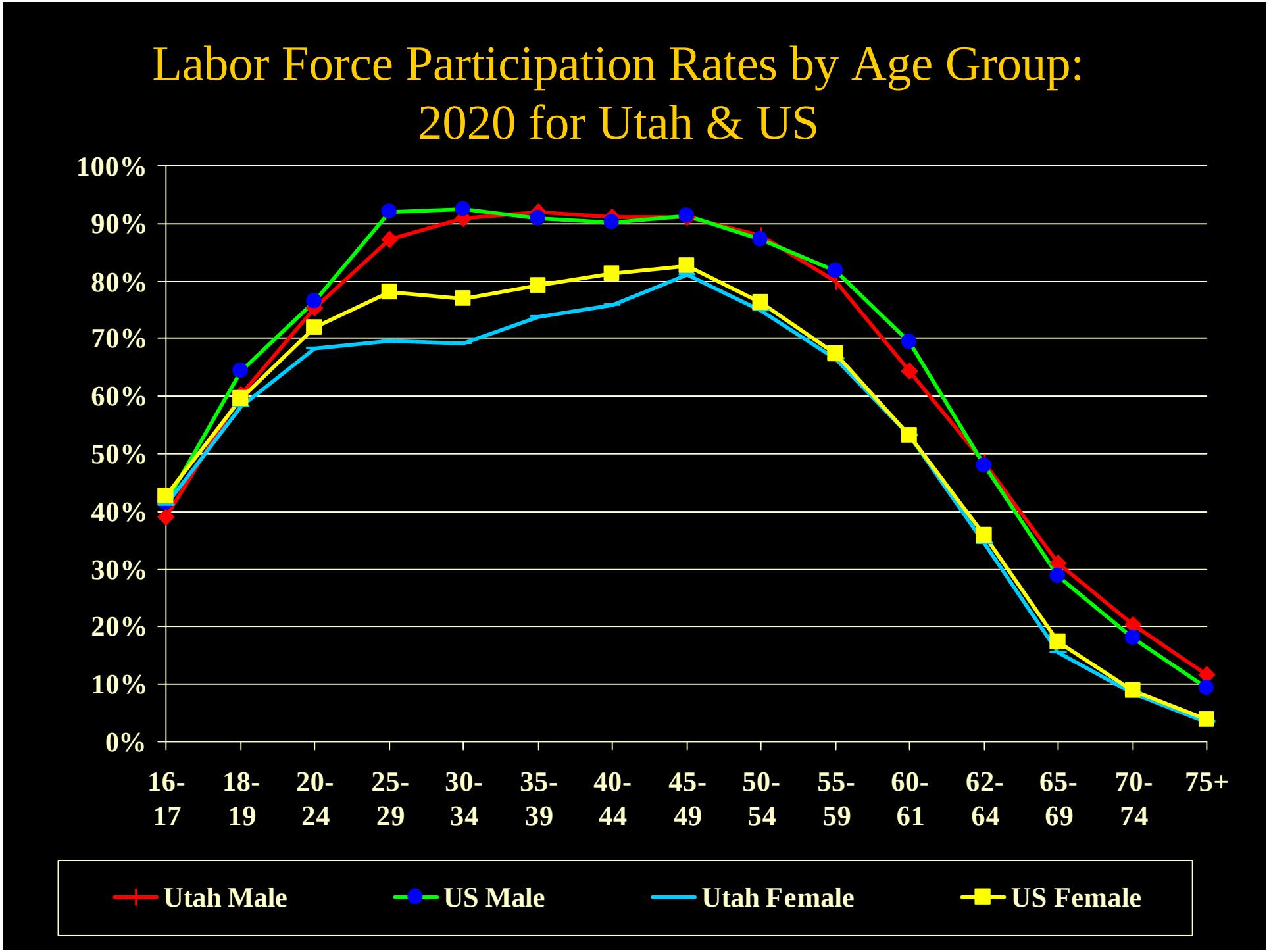
Utah Labor Force Participation Rates by Age Group: 1990 & 2020 Medium LFPR



Labor Force Participation Rates by Age Group: 1990 For Utah & US



Labor Force Participation Rates by Age Group: 2020 for Utah & US



Summary

- Utah has higher rates of economic and population growth, fertility, and survival than the nation.
- Growth in the demand for Utah's exports and the associated increases in employment have the greatest effect on the state's population size.
- Fertility, while affecting population size, has its greatest effects on age composition, average household size, and the components of population change.
- Survival has its greatest effects on the age composition, particularly on the number and share of the elderly population.
- Changing labor force participation rates act as a substitute for employment-related migration.